

*FINAL*  
**ENVIRONMENTAL ASSESSMENT**  
**FOR**  
**MANAGEMENT OF SOUTH END OF RUNWAY WETLANDS,**  
**MOODY AFB, GEORGIA**



**MOODY AFB**  
**23RD WING**



**NOVEMBER 2010**

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>NOV 2010</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2010 to 00-00-2010</b>	
4. TITLE AND SUBTITLE <b>Final Environmental Assessment for Management of South End of Runway Wetlands, Moody AFB, Georgia</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>HDR Inc,8404 Indian Hills Drive,Omaha,NE,68114</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <b>The USAF proposes to implement a management program for the wetlands at the south end of runway (EOR) at Moody AFB to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of the south EOR wetlands complex is to reduce the attractiveness of this area to birds and other wildlife that pose a BASH risk to Moody AFB pilots and aircraft. An adaptive approach could require the implementation of all or parts of the various management alternatives presented in the EA, at varying points in time, depending on the results achieved. The proposed methods for achieving the stated purpose and need are presented in this EA as five management alternatives and one No Action Alternative. The EA evaluates the potential environmental consequences on the following eight general impact topics: noise; air quality; socioeconomic resources and environmental justice; aircraft safety, including BASH concerns; water resources; geological resources; wetlands; and biological resources, including rare, threatened, and endangered species. The Draft EA was made available to government agencies and the public for a 30-day review period. No comments were received from agencies or the public. After careful consideration of the alternatives analysis presented in this EA, in accordance with Title 40 Code of Federal Regulations (CFR) Section 1502.14(e), the USAF has decided that the No Action Alternative is the Preferred Alternative. Therefore none of the action alternatives will be implemented based on the analysis in this EA, as reflected in the associated Finding of No Significant Impact (FONSI).</b>					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT  <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES  <b>218</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



## FINDING OF NO SIGNIFICANT IMPACT (FONSI)

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### 1.0 NAME OF THE PROPOSED ACTION

Management of South End of Runway Wetlands, Moody Air Force Base (AFB), Georgia

### 2.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to manage the wetlands within the region of influence (ROI) so that it becomes less attractive to birds and other wildlife. For the purposes of the Proposed Action, the south end of runway (EOR) and southeastern corner area of the runway at Moody AFB, Georgia make up the ROI. The Proposed Action is needed because birds and other wildlife pose an increased bird/wildlife aircraft strike hazard (BASH) risk to aircraft utilizing the Moody AFB airfield. In support of the military mission, Moody AFB has implemented a BASH management program designed to minimize aircraft exposure to potentially hazardous wildlife strikes within the vicinity of the installation. However, due to the continued BASH risk associated with the ROI wetland areas, there is a need to improve current BASH management methods to minimize future BASH risk in these areas.

### 3.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

**Proposed Action.** The USAF proposes to implement the intensive management of the ROI wetlands at Moody AFB in order to reduce the BASH risk to pilots and aircraft utilizing the Moody AFB runway or the airspace in the vicinity of the runway. Under the Proposed Action, the USAF could choose to implement any of the evaluated wetland management alternatives presented in Section 2 of the Environmental Assessment (EA), either alone or in combination with other alternatives. The goal for the intensive management of the ROI is to reduce the attractiveness of this area to birds and other wildlife that pose an increased BASH risk to Moody AFB pilots and aircraft via habitat alteration in order to minimize the potential BASH risk from wetland-related wildlife, and to ensure the vegetation in the area does not protrude into the glide path or attract large concentrations of hazardous wildlife species, particularly large-bodied wading species (e.g., egrets and herons) and flocking species.

**No Action Alternative.** Under the No Action Alternative, the south EOR and southeastern corner wetlands would not receive additional intensive management. Periodic herbicide treatments and prescribed burning would continue to be conducted to control vegetation in this area, as well as application of currently used BASH techniques to attempt to discourage wildlife use of the area.

### 4.0 SUMMARY OF ENVIRONMENTAL EFFECTS

The public and regulatory agency scoping process focused the analyses on the following environmental impact topics: noise; air quality; socioeconomic resources and environmental justice; aircraft safety, including BASH concerns; water resources; geological resources; wetlands; and biological resources, including rare, threatened, and endangered species. Details of the environmental consequences can be found in the Environmental Assessment (EA), which is hereby incorporated by reference.

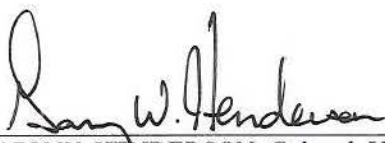
### 5.0 CONCLUSION

The Draft EA was made available to government agencies and the public for a 30-day review period. No comments were received from agencies or the public. However, the environmental impact analyses for four of the five action alternatives (Alternative 1 - Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches; Alternative 2 - Complete Filling of Wetland Complex; Alternative 3 - Dredging of Wetlands to Create Lake; and Alternative 4 - Partial Dredge and Fill) indicate that major adverse impacts on one or more resources of concern may occur if implemented. Neither Alternative 5, Increased Access and Vegetation Management, nor the No Action Alternative would result in major adverse impacts.



## 6.0 FINDINGS

After careful consideration of the alternatives analysis contained in the EA, in addition to consideration of the potential success of each alternative meeting the purpose and need weighed against the respective potential environmental impacts and other decision making factors, I conclude that the USAF adopt the No Action Alternative as its preferred alternative, and approve this FONSI for the No Action Alternative. This decision has been made after taking into account all submitted information, and considering a full range of practical alternatives that would meet project requirements and are within the legal authority of the USAF. In accordance with this decision, none of the action alternatives presented in the EA would be implemented without follow-on NEPA documentation taking place. Should the USAF decide in the future to implement one of the action alternatives presented in the EA, the EA would be supplemented with a new decision document, or the preparation of a Record of Intent to facilitate the preparation of an Environmental Impact Statement [40 CFR 1508.9(a)(3)].



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GARY W. HENDERSON, Colonel, USAF  
Commander, 23rd Wing

08 Feb 11

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Date

## ABBREVIATIONS AND ACRONYMS

$\mu\text{g}/\text{m}^3$	microgram per cubic meter	IWDM	Integrated Wildlife Damage Management
23 MSG	23rd Mission Support Group	mgd	million gallons per day
23 FG	23rd Fighter Group	MSL	mean sea level
23 WG	23rd Wing	NAAQS	National Ambient Air Quality Standards
347 RQG	347th Rescue Group	NEPA	National Environmental Policy Act
563 RQG	563th Rescue Group	NOA	Notice of Availability
820 BDG	820th Base Defense Group	NOI	Notice of Intent
ACC	Air Combat Command	$\text{NO}_x$	nitrogen oxides
AFB	Air Force Base	NPDES	National Pollution Discharge Elimination System
AFI	Air Force Instruction	NRCS	Natural Resources Conservation Service
AGL	above ground level	$\text{O}_3$	ozone
AQCR	Air Quality Control Region	OSHA	Occupational Safety and Health Administration
BASH	Bird/wildlife aircraft strike hazard	percent g	percentage of the force of gravity
BMP	best management practice	$\text{PM}_{2.5}$	particulate matter equal to or less than 2.5 microns
CAA	Clean Air Act	$\text{PM}_{10}$	particulate matter equal to or less than 10 microns
CAAA	Clean Air Act Amendment	PSD	prevention of significant deterioration
CEQ	Council on Environmental Quality	ROI	region of influence
CFR	Code of Federal Regulations	SHPO	State Historic Preservation Office
$\text{CO}_2$	carbon dioxide	SIP	State Implementation Plan
CO	carbon monoxide	$\text{SO}_x$	sulfur oxides
CSAR	combat search and rescue	SR	State Road
CWA	Clean Water Act	SUA	Special Use Airspace
dba	A-weighted decibels	SWPPP	Storm Water Pollution Prevention Plan
DNL	Day-Night Average A-weighted Sound Level	TMDL	Total Maximum Daily Load
DNR	Department of Natural Resources	tpy	tons per year
DOD	Department of Defense	U.S.C.	United States Code
EA	Environmental Assessment	USACE	U.S. Army Corps of Engineers
EIS	Environmental Impact Statement	USAF	U.S. Air Force
EO	Executive Order	USEPA	U.S. Environmental Protection Agency
EOR	End of Runway	USDA	U.S. Department of Agriculture
ESA	Endangered Species Act	USFWS	U.S. Fish and Wildlife Service
FAA	Federal Aviation Administration	USGS	U.S. Geological Survey
FEMA	Federal Emergency Management Agency	VOC	volatile organic compound
FIRM	Flood Insurance Rate Map	WMA	Wildlife Management Area
FONPA	Finding of No Practicable Alternative		
FONSI	Finding of No Significant Impact		
FPPA	Farmland Protection Policy Act		
GHG	greenhouse gas		
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning		
INRMP	Integrated Natural Resources Management Plan		

## COVER SHEET

### FINAL ENVIRONMENTAL ASSESSMENT FOR MANAGEMENT OF THE WETLANDS AT THE SOUTH END OF RUNWAY WETLANDS, MOODY AFB, GEORGIA

**Responsible Agencies:** U.S. Air Force (USAF), 23rd Wing (23 WG), Moody Air Force Base (AFB), Georgia.

**Affected Location:** Moody AFB, Georgia.

**Report Designation:** Final Environmental Assessment (EA).

**Abstract:** The USAF proposes to implement a management program for the wetlands at the south end of runway (EOR) at Moody AFB to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of the south EOR wetlands complex is to reduce the attractiveness of this area to birds and other wildlife that pose a BASH risk to Moody AFB pilots and aircraft. An adaptive approach could require the implementation of all or parts of the various management alternatives presented in the EA, at varying points in time, depending on the results achieved.

The proposed methods for achieving the stated purpose and need are presented in this EA as five management alternatives and one No Action Alternative. The EA evaluates the potential environmental consequences on the following eight general impact topics: noise; air quality; socioeconomic resources and environmental justice; aircraft safety, including BASH concerns; water resources; geological resources; wetlands; and biological resources, including rare, threatened, and endangered species.

The Draft EA was made available to government agencies and the public for a 30-day review period. No comments were received from agencies or the public. After careful consideration of the alternatives analysis presented in this EA, in accordance with Title 40 Code of Federal Regulations (CFR) Section 1502.14(e), the USAF has decided that the No Action Alternative is the Preferred Alternative. Therefore, none of the action alternatives will be implemented based on the analysis in this EA, as reflected in the associated Finding of No Significant Impact (FONSI).

Written inquiries regarding this document should be sent Ms. Rebecca Lopez, Environmental Planner, Moody AFB, 23 CES/CEAO, 3485 Georgia Street, Moody AFB, GA 31699.





**FINAL  
ENVIRONMENTAL ASSESSMENT FOR MANAGEMENT OF THE WETLANDS  
AT THE SOUTH END OF RUNWAY MOODY AFB, GEORGIA**

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## 1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

This Environmental Assessment (EA) describes and analyzes the 23rd Wing's (23 WG) proposal to manage wetlands in the south end of runway (EOR) and southeastern corner area of the runway. For the purposes of this EA the south EOR and southeastern corner area of the runway make up the region of influence (ROI). This section presents background information, the purpose of and need for management of the wetlands in the ROI, the location and mission of Moody Air Force Base (AFB), the scope of environmental review, and an introduction to the organization of this document.

### 1.1 Background

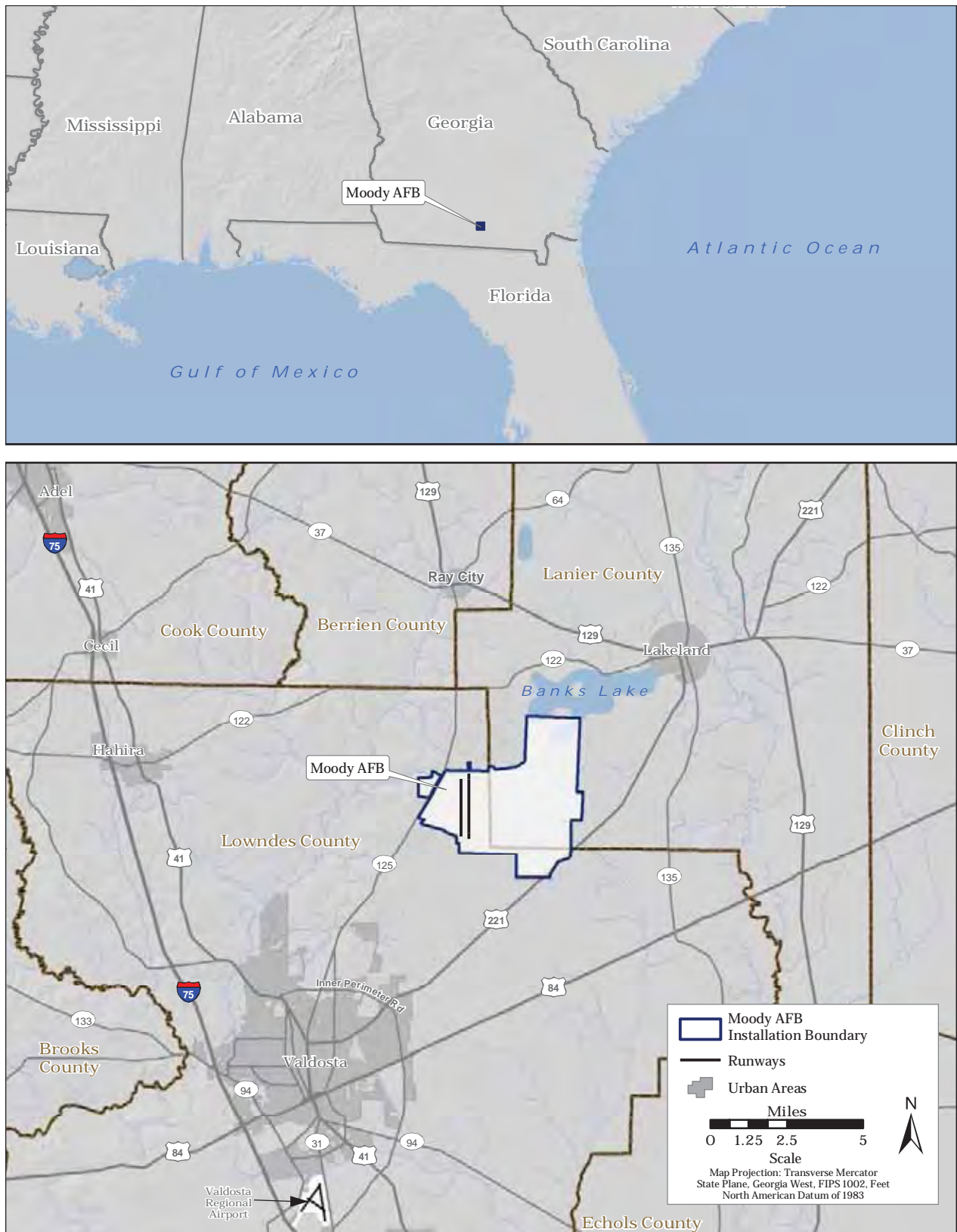
Moody AFB is an Air Combat Command (ACC) installation in southern Georgia (see **Figure 1-1**), consisting of 10,843 acres in Lowndes and Lanier counties. The installation is approximately 10 miles northeast of the City of Valdosta. More than 4,200 personnel are currently stationed at Moody AFB. The 23 WG is headquartered at Moody AFB and is a component of ACC. As an ACC installation, Moody AFB fulfills ACC's mission as the primary provider of combat airpower to America's unified combatant commands. The 820th Base Defense Group (820 BDG) is also assigned to Moody AFB; however, it is a separate group and does not operate under the 23 WG. The mission of the 23 WG is to organize, train, and employ a combat-ready A-10, HC-130, and HH-60 wing consisting of approximately 6,100 military and civilian personnel. The wing executes worldwide close air support, force protection, and peacetime and combat search and rescue (CSAR) operations in support of humanitarian interests, U.S. national security interests, and the global war on terrorism.

The 23rd Fighter Group (23 FG), 347th Rescue Group (347 RQG), 23rd Mission Support Group (23 MSG), 23rd Medical Group, 23rd Maintenance Group, and the 563rd Rescue Group (563 RQG) all operate under the 23 WG. The 23 FG Flying Tigers direct the flying and maintenance operations for the U.S. Air Force's (USAF) largest A-10 fighter group. The 23 FG ensures overall combat training and readiness for more than 100 pilots and 800 maintenance and support personnel. The 347 RQG directs flying and maintenance of the only USAF active-duty Operations Group dedicated to CSAR. The mission of the 347 RQG is completed through the operation of HC-130 transport aircraft and HH-60 helicopters. The mission of the 23 MSG is to train, equip, and deploy personnel support forces to build, protect, and sustain air installations worldwide for combat air operations.

There are two active parallel runways at Moody AFB: the eastern runway (Runway 18L/36R) and the western runway (Runway 18R/36L). Both runways are oriented in a north/south direction; Runway 18L/36R is 9,300 feet long by 150 feet wide, and Runway 18R/36L is 8,000 feet long by 150 feet wide. Bird and wildlife strikes are a pilot and aircraft safety concern near these runways due to the potential damage that a strike might have on the aircraft and flight mission or serious bodily injury to pilots and aircrews. USAF accident studies have found 61 percent of aircraft accidents near USAF installations were related to landing operations, and 39 percent were related to takeoff operations (DAF 1999). Because the wetlands in the ROI are within the critical clear zone for approaches and takeoffs and are near the runways, which attract birds and wildlife, managing the wetlands to reduce bird/wildlife aircraft strike hazard (BASH) risk is an important aircraft operational safety concern at Moody AFB.

Birds can be encountered at altitudes of 30,000 feet and higher; however, strike rates rise substantially as altitude decreases. Most birds fly close to ground level and 95 percent of all reported incidents in which a USAF aircraft has struck a bird has been at an altitude of less than 3,000 feet above ground level (AGL). Approximately half of these bird strikes occur in the airport environment and about one-third occur during low-altitude training. The USAF devotes considerable attention to avoiding the possibility of





**Figure 1-1. Moody Air Force Base General Location**

BASH strikes. The USAF conducted a worldwide program for decades to study bird migrations, bird flight patterns, and past strikes to develop predictions of where and when bird/wildlife-aircraft strikes might occur so these incidents can be avoided (HQ AFRC 2009). For the purposes of this EA, the ROI wetlands are composed of two areas totaling 120 acres: the area of approximately 112 acres of wetland drainage situated immediately south of the Moody AFB runway and Perimeter Road (south EOR wetlands); and a smaller 8-acre area of wetlands off the southeastern corner of the runway (southeastern corner wetlands). Due to the presence of birds and other wildlife species (e.g., white-tailed deer [*Odocoileus virginianus*], American alligator [*Alligator mississippiensis*], coyote [*Canis latrans*], red fox [*Vulpes vulpes*]) that are attracted to the ROI wetlands, an elevated BASH risk exists in these areas at Moody AFB. From 2003 to 2008, Moody AFB aircraft have been involved in an average of 111 bird strikes annually, with a range from 90 to 121 strikes per year (MAFB 2009). In support of the military mission, Moody AFB has implemented a BASH management program designed to minimize aircraft exposure to potentially hazardous wildlife strikes, especially birds, within the vicinity of the installation (MAFB 2003a).

**Figure 1-2** shows the areas proposed for management and the delineated jurisdictional wetlands and other waters of the United States within the ROI. This EA addresses potential environmental consequences associated with the Proposed Action and reasonable alternatives. Details on the Proposed Action and reasonable alternatives are presented in **Section 2**.

## 1.2 Current BASH Management Practices

Moody AFB uses a variety of wildlife damage management techniques and practices, including habitat modification, monitoring of wildlife in the vicinity of the installation, wildlife dispersal techniques (harassment), and lethal and nonlethal control of high-risk individual animals. Additionally, Moody AFB has agreements with local landowners that are designed to reduce the attractiveness of agricultural areas adjacent to the installation to birds and other wildlife species. For example, livestock owners are required to remove dead livestock with 24 hours after discovery (USAF 1996). Specific BASH management practices within the ROI include periodic herbicide spraying to control tree/shrub growth; mowing/chopping of uplands adjacent to the wetlands; prescribed burning of the wetlands when feasible; and application of intensive BASH practices including pyrotechnics, use of propane cannons and horns, daily monitoring, and permitted depredation.

## 1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to manage the ROI so that it becomes less attractive to birds and other wildlife. This Proposed Action is needed because birds and other wildlife pose an increased BASH risk to aircraft utilizing the Moody AFB airfield. **Table 1-1** presents airstrikes with wetland-related bird species at Moody AFB that occurred within or near the ROI (e.g., take-off, approach, and landing phases) between January 1990 and June 2009. In support of the military mission, Moody AFB has implemented a BASH management program designed to minimize aircraft exposure to potentially hazardous wildlife strikes within the vicinity of the installation. However, due to the continued BASH risk associated with the ROI wetland areas, there is a need to improve current BASH management methods to minimize future BASH risk in these areas.

An extended BASH EA was published in 2003 that called for the expansion of the BASH management plan to include land, both public and private, in a 5-mile radius around Moody AFB (MAFB 2003a). However, Moody AFB has determined that additional measures in the form of ecosystem alteration are needed to effectively reduce the BASH risk associated with the ROI wetlands to acceptable levels.





**Figure 1-2. Location of the Proposed Action, Moody Air Force Base**

**Table 1-1. Moody AFB Airstrikes with Wetland-Related Bird Species within or near the ROI from January 1990 to June 2009**

<b>Date</b>	<b>Aircraft</b>	<b>Altitude</b>	<b>Species</b>
25 January 1990	Unknown	Unknown	Cattle egret
18 May 1993	F-16	1,000 feet	White ibis
7 December 1993	F-16	30 feet	Red-winged blackbird
5 October 1995	F-16	Unknown	Red-winged blackbird
18 January 1996	F-16	200 feet	Red-winged blackbird
2 August 1996	F-16	Landing	Cattle egret
14 August 1996	F-16	200 feet	Snowy egret
14 October 1998	HH-60	Low-level	Red-winged blackbird
12 September 2000	HH-60	300 feet	Eastern kingbird
18 April 2001	T-38	75 feet	Great blue heron
22 October 2002	Unknown	0 feet	Red-winged blackbird
11 November 2002	T-38	100 feet	Red-winged blackbird
19 December 2002	T-38	Unknown	Red-winged blackbird
6 January 2003	T-6	UNK (Initial climb)	Red-winged blackbird
9 January 2003	T-38	40 feet	Red-winged blackbird
16 January 2003	Unknown	Landing	Red-winged blackbird
11 March 2004	T-6	300 feet	Little blue heron
14 July 2004	Unknown	0 feet	Eastern kingbird
7 November 2004	HH-60	Unknown	Dabbling duck
8 November 2004	HH-60	1,000 feet	Dabbling duck
22 December 2004	T-6	Unknown	Red-winged blackbird
28 June 2005	T-6	Unknown	White ibis
27 July 2005	Unknown	Unknown	Eastern kingbird
3 March 2006	T-6	Unknown	Red-winged blackbird
6 March 2006	T-6	Unknown	Red-winged blackbird
13 March 2006	C-5	Unknown (Approach)	Red-winged blackbird
19 June 2006	T-38	200 feet	Great egret
22 March 2007	T-38	2,000 feet (Landing)	Anhinga
14 May 2007	HC-130	40 feet	Semipalmated plover
29 August 2007	HC-130	750 feet	American coot
20 September 2007	HC-130	Unknown	American coot
24 June 2008	HC-130	Unknown	Great blue heron
3 July 2008	A-10	300 feet	White ibis
5 August 2008	HH-60	100 feet	Red-winged blackbird

Source: MAFB 2009



## 1.4 Summary of Key Environmental Compliance Requirements

### 1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] Section 4321–4347) is a Federal statute requiring the identification and analysis of potential environmental impacts associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed, structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a Proposed Action and considers alternative courses of action.

The process for implementing NEPA is codified in Title 40 of the Code of Federal Regulations (CFR), Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI) or whether the preparation of an Environmental Impact Statement (EIS) is necessary. The EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

### 1.4.2 Other Key Environmental Compliance Requirements

The *Migratory Bird Treaty Act of 1918* (16 U.S.C. 703–712), as amended, is a law established to help conserve migratory birds, their nests, and eggs from being destroyed without a permit. No permit is needed to harass or scare migratory birds except for endangered or threatened species or bald eagles. Under this Act, a Federal depredation permit is required for the taking (e.g., kill, trap, capture) of birds at airports or airfields. This permit is issued annually by the U.S. Fish and Wildlife Service (USFWS). As part of the permitting requirements, the USFWS requires an annual report detailing the number of birds killed on airport or airfield properties and methods used. The U.S. Department of Agriculture (USDA), Wildlife Services has the only USFWS-issued depredation permit for Moody AFB. Any shooting or other mortality of birds must be coordinated through USDA, Wildlife Services. Personnel who are involved with the mortality of migratory birds outside the conditions of this permit are subject to fines or prison sentences, per the Migratory Bird Treaty Act (23 WG 2008). The depredation permit at Moody AFB is used for the direct control of wildlife species such as vultures, ducks, hawks, and egrets that pose an immediate threat to aircraft and human safety.

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption.

Wetlands are protected under Executive Order (EO) 11990, *Protection of Wetlands* (43 Federal Register 6030). The purpose of the EO is to reduce adverse impacts associated with the destruction or modification of wetlands. The USAF is required to identify and locate jurisdictional wetlands and other



waters of the United States that occur in areas where these resources have the potential to be impacted by military mission activities. It is USAF policy not to construct new facilities within areas containing wetlands where practicable. If the Proposed Action were approved, a Finding of No Practicable Alternative (FONPA) would be prepared and subsequently approved by ACC demonstrating that the USAF has found no practicable alternatives to construction within the area that would affect wetlands.

Floodplains are protected under EO 11988, *Floodplain Management*. If an action is proposed that would encroach on the floodplain and alter the flood hazards designated on a Federal Emergency Management Agency (FEMA) national Flood Insurance Rate Map (FIRM) (e.g., changes to the floodplain boundary), the USAF must submit an analysis to FEMA identifying and evaluating practicable alternatives and identifying impacts of the Proposed Action. If impacts cannot be avoided, mitigation measures must be developed to minimize impacts on floodplains.

Section 404 of the Clean Water Act of 1977 (CWA) establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE). Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. Moody AFB would be required to work with the USACE to obtain a Section 404 permit prior to any proposed wetland fill activities, and would be required to compensate for the loss of any wetlands as a condition of the permit.

Air Force Instruction (AFI) 91-202, *The USAF Mishap Prevention Program*, implements Air Force Policy Directive 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including BASH), assigns responsibilities for program elements, and contains program management information.

Air Force Policy Directive 32-70, *Environmental Quality*, states that the USAF will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is its *Environmental Impact Analysis Process* that is detailed in 32 CFR Part 989, as amended.

### 1.4.3 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decisionmaking process for Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of major environmental issues and requirements associated with a Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

This EA examines potential effects of five alternatives and the No Action Alternative on the following eight resource categories that were determined through the scoping process to be relevant to the Proposed Action:

- Noise
- Air Quality
- Socioeconomic Resources and Environmental Justice
- Aircraft Safety, including BASH Concerns

- Water Resources
- Geological Resources
- Wetlands
- Biological Resources, including Rare, Threatened, and Endangered Species.

## 1.5 Interagency Coordination and Public Involvement

The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. AFI 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning* (IICEP), requires the USAF to implement the IICEP process, which is used for the purpose of agency coordination and implements scoping requirements (i.e., to determine the scope of issues to be addressed in detail in the EA). Through the IICEP process, the USAF notifies relevant Federal, state, and local agencies of the Proposed Action and alternatives and provides them sufficient time to make known their environmental concerns specific to the Proposed Action and alternatives. IICEP letters, sent 29 April 2009, and responses to date are included in **Appendix B**.

NEPA requirements also help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if Federal proponents of an action provide information to state and local governments and the public and involve them in the planning process. CEQ guidance in 40 CFR 1501.7 specifically states, “There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to proposed actions. This process shall be termed scoping.” The public involvement process augments the USAF opportunity to cooperate with and consider state and local views in implementing a Federal proposal.

Through the public involvement process, Moody AFB notifies relevant Federal, state, and local agencies of the Proposed Action and requests input regarding environmental concerns they might have regarding the Proposed Action. The public involvement process provides Moody AFB with the opportunity to cooperate with and consider state and local views in its decision regarding implementing this Federal proposal. As part of the public involvement process for this EA, Moody AFB coordinated with the U.S. Environmental Protection Agency (USEPA); USFWS; USACE; and other Federal, state, and local agencies (see **Appendix B**) and stakeholders.

A Notice of Availability (NOA) for this EA was published in local newspapers, kicking off a 30-day public review period. The published NOA solicits comments on the Proposed Action and alternatives and is intended to involve the local community in the decisionmaking process. No comments received from the public and other Federal, state, and local agencies. A copy of the NOA is contained in **Appendix C**.

## 1.6 Organization of the EA

The EA is organized into seven sections plus appendices as follows:

- **Section 1** contains background information on Moody AFB, a statement of the purpose of and need for the Proposed Action, a summary of applicable regulatory requirements, a discussion of agency coordination and public involvement, and an introduction to the organization of the EA.
- **Section 2** provides a detailed description of the Proposed Action and a discussion of the alternatives considered, including the No Action Alternative; and a description of the decision to be made.

- **Section 3** contains a characterization of the affected environment, or baseline environmental conditions, and addresses potential environmental consequences associated with the Action Alternatives and No Action Alternative.
- **Section 4** provides an analysis of the potential cumulative impacts on Moody AFB and the surrounding area.
- **Section 5** presents the preparers of the document.
- **Section 6** lists the reference documents used in the preparation of the EA.
- **Appendix A** provides a summary of key laws, regulations, policies, and planning criteria that are often considered in the NEPA analysis.
- **Appendix B** provides materials related to IICEP.
- **Appendix C** provides information related to Public Involvement.
- **Appendix D** provides photo documentation of the ROI wetland areas subject to this EA.
- **Appendix E** provides the air quality calculations.
- **Appendix F** provides mitigation requirements and cost estimates for each alternative under the Proposed Action.
- **Appendix G** provides Moody AFB's current USFWS Bird Depredation Permit.

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## 2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section provides detailed information on the Proposed Action and the alternatives for implementing the Proposed Action that will be analyzed in detail in the EA.

### 2.1 Proposed Action

The USAF proposes to implement the intensive management of the ROI wetlands at Moody AFB in order to reduce the BASH risk to pilots and aircraft utilizing the Moody AFB runway or the airspace in the vicinity of the runway. Under the Proposed Action, the USAF could choose to implement any of the evaluated wetland management alternatives presented in **Sections 2.2.2 through 2.2.6**, either alone or in combination with other alternatives. The goal for the intensive management of the ROI is to reduce the attractiveness of this area to birds and other wildlife that pose an increased BASH risk to Moody AFB pilots and aircraft.

Immediately south of the airfield is a 120-acre wetland, of which 90.65 acres are jurisdictional wetlands. This area was cleared of woody vegetation in 2000 to remove conflicts with the glide slope for the safety of military aircraft using the Moody AFB runways. This area remains saturated except in the driest conditions. Following rain events, this area contains large areas of standing water. Since the removal of the woody vegetation, large wading birds have been observed on the site, along with small flocks of medium-sized wading birds (e.g., white ibis and little blue heron) (MAFB 2001). Currently, the vegetation in the ROI is composed of small (less than 8-foot-tall) pond cypress, red maple, blackgum, and bay trees; and submerged and emergent wetland vegetation, primarily water lilies (MAFB 2008a). Based on the most recent wetland inventory, 90.65 acres of the ROI are classified as jurisdictional wetlands and other waters of the United States (MAFB 2007).

At least 34 recorded strikes have occurred with wetland-related bird species within or near the ROI since 1990 (see **Table 1-1**) (MAFB 2009). Due to the continued presence of BASH-related species in the ROI, the USAF is proposing to implement management strategies to alter the habitat and ecosystem features of these wetlands to deter BASH-related species. The primary wildlife species of concern at Moody AFB are flocking birds and birds of large body size, which include European starlings and blackbirds, eastern meadowlarks, crows, egrets, herons, ibis, ducks, sandhill cranes, and vultures. During the primary migration periods of spring and fall, large numbers of birds present a hazard at Moody AFB. Egrets, cranes, and vultures are of particular concern due to their large body size and propensity to form large flocks. Juvenile animals are also a concern because they are generally unfamiliar with airport environments and often respond unfavorably to approaching aircraft. Large mammals such as coyotes and white-tailed deer have been a concern in the past (MAFB 2003b).

The risk of a bird-aircraft strike increases with bird occurrence within the aircraft operating environment, especially on the airfield or near the approach and departure paths. Seventy-one percent of bird strikes occur below 500 feet altitude above ground level, which is mostly during takeoffs and landings. While the exact locations of most strikes involving Moody AFB aircraft are unknown, the majority of known strikes occur during low-level flights (MAFB 2003a). Since the ROI is crossed during takeoffs and landings by Moody AFB aircraft, it could be assumed that BASH risk to aircraft would be greatest within and near the ROI.

Current bird dispersal techniques employed by Wildlife Services, Airfield Management and the Air Traffic Control Tower include ScareWars® cannon system, audio distress tapes, sirens, and pyrotechnics (bangers). The efficiency of this program has been greatly enhanced by reinforcing hazing techniques with lethal control. Shooting gulls, raptors, shorebirds, herons, egrets, and waterfowl including resident



Canada geese requires a migratory bird depredation permit issued by the USFWS. Wildlife Services at Moody AFB maintains a current copy of this permit on behalf of the Wing Safety Office.

According to Section 7.11 of AFI 91-202, which establishes mishap prevention program requirements for USAF personnel, the following Bird Watch Condition codes are to be used to communicate local bird activity:

- **Severe:** Bird activity on or immediately above the active runway or other specific location representing high potential for strikes. Supervisors and aircrews must thoroughly evaluate mission need before conducting operations in areas under condition “Severe.”
- **Moderate:** Bird activity near the active runway or other specific location representing increased potential for strikes. Bird Watch Condition “moderate” requires increased vigilance by all agencies and supervisors and caution by aircrews.
- **Low:** Bird activity on and around the airfield representing low potential for strikes.

A BASH EA was developed in 2001 that proposed Integrated Wildlife Damage Management (IWDM) techniques to address the safety risk presented by wetland birds and other wildlife that inhabit the ROI wetlands (MAFB 2001). The BASH EA recommended six strategies aimed at reducing the occurrence of bird strikes including observation of bird conditions, allowing scientists to rate the severity of the BASH conditions and dictate corresponding flying restrictions, use of Bird Avoidance Models to predict bird occurrence, use of a radar system to monitor real time bird movements through established air traffic patterns, habitat modification, nonlethal removal of wildlife (i.e., trapping and relocation), and lethal control of wildlife with the proper permits. A FONSI for this EA was signed on 13 June 2001.

An extended BASH EA was published in 2003 that proposed the expansion of the BASH management program to include public and private land in a 5-mile radius around Moody AFB (MAFB 2003a). The 2003 EA proposed both nonlethal and lethal strategies, including prediction of bird occurrence through bird avoidance models, forage reduction through mowing and removal of dead livestock within wetland areas, wildlife dispersal techniques and harassment, nest destruction of cattle egrets nests, destruction and oiling of cattle egrets eggs, and lethal methods for population control. In addition, the 2003 EA also proposed adding the turkey vulture (*Cathartes aura*) and black vulture (*Coragyps atratus*) to the list of species authorized for lethal control within the boundaries of Moody AFB. A FONSI for the 2003 EA was signed on 2 August 2004.

In a further response to continuing BASH concerns at the installation, Moody AFB proposes the management of the wetlands within the ROI via habitat alteration in order to minimize the potential BASH risk from wetland-related wildlife and to ensure the vegetation in the area does not protrude into the glide path or attract large concentrations of hazardous wildlife species, particularly large-bodied wading species (e.g., egrets and herons) and flocking species.

## 2.2 Alternatives for Implementing the Proposed Action

### 2.2.1 Introduction

The USAF considered several alternatives for implementing the Proposed Action. In the initial screening of these alternatives, the USAF took into consideration minimum selection criteria. Only those alternatives that met these criteria were considered suitable for detailed analysis. The selection criteria were conformance to existing laws; ACC, USAF, and Department of Defense policy and regulations; compatibility with Section 7.11 of AFI 91-202, *U.S. Air Force Mishap Prevention Program: Bird Aircraft Strike Hazard Program*, and existing Moody AFB BASH programs and management strategies;

and satisfactorily meeting the stated requirements of reducing BASH risk and minimizing vegetation concerns relative to pilot and aircraft safety.

Five wetland management alternatives were proposed to meet the purpose and need for the Proposed Action. The following discussion identifies the implementation alternatives considered by the USAF and identifies whether they are reasonable and, hence, subject to detailed evaluation in the EA. The evaluated alternatives (see **Sections 2.2.2** through **2.2.6**) met the screening criteria listed above and therefore are evaluated in detailed analysis in this EA. As required, the No Action Alternative was also considered.

In accordance with the CEQ regulations, a preferred alternative needs to be identified during the NEPA process. In the Draft EA, a preferred alternative had not yet been selected. After careful consideration of the alternatives analysis presented in this EA and other decisionmaking factors, the USAF has decided to adopt the No Action Alternative as the preferred alternative for this proposed action. Additional information on the decision to be made is contained in **Section 2.3**.

### 2.2.2 Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches

Alternative 1 includes the intensive management of the south EOR wetlands by creating several ditches to concentrate surface water in discrete areas and more effectively move surface water offsite via the existing outflow pattern. A ditch would be placed along the perimeter of the south EOR wetlands. Multiple interior parallel ditches would be connected to the perimeter ditch on their northern and southern ends (see **Figure 2-1**). Additional ditches would be installed in the southeastern corner wetlands. The placement of these ditches would be determined based on topographic variation within the south EOR wetlands. The ditches would be situated in the lowest areas within this complex to maximize drainage while minimizing overall surface water within the complex. This ditch complex would be connected to existing culverts to move water from one wetland area to the next and eventually off-installation in a southeasterly direction. The ditches would be approximately 3 feet deep and 60 feet wide with bank slopes made in a 10 to 1 ratio. The cross-sectional profile of the ditches would be designed (i.e., 10 to 1 slopes) to avoid side sloughing, thereby reducing the frequency of maintenance dredging. Ditches would be maintained periodically to remove accumulated sediments and to ensure no vegetation grows within the ditches that could possibly attract wildlife. Additionally, a French drain would be installed north of the south EOR wetlands in a west-to-east direction along the southern edge of Burma Road. This French drain would collect storm water sheet flow from the airfield and runway north of the south EOR wetlands and divert it to the existing downgradient wetlands east of the installation (see **Figure 2-1**).

Civil Engineering would regularly inspect the ditches to keep them clear and obstacle free. In order to discourage wading birds and emergent vegetation, ditches would be planted with native floating-leaved aquatic vegetation (e.g., yellow pond-lily (*Nuphar lutea*) or American white water-lily (*Nymphaea odorata*)) that would reduce open water, thereby decreasing the opportunity for use of the standing water for feeding purposes by waterfowl and wading birds. The remaining wetlands outside of the ditches could be planted with titi (*Cyrilla racemiflora*). Frequent removal of emergent vegetation would be necessary to maintain flow and discourage use by birds. Any activities in the drainage ditches would be consistent with Section 404 of the CWA.

### 2.2.3 Alternative 2 - Complete Filling of Wetland Complex

Alternative 2 would involve the fill of approximately 120 acres of wetlands on Moody AFB, 90.65 acres of which are jurisdictional under the CWA. A French drain would be installed as described in Alternative 1 (**Section 2.2.2**) to catch storm water sheet flow from the airfield and runways north of the south EOR wetlands. Additional storm water outfalls and natural drainages leading to the south EOR

wetlands would be diverted to other wetland areas through the use of ditches, French drains, or other conveyances. The location of the receiving wetlands would be determined based upon a topographic analysis to determine the closest appropriate alternative downgradient location, and might occur on off-installation properties. Once water inflows into the wetland systems are stopped, the wetlands would be filled with clean fill material from a yet-to-be determined source. The new uplands would be planted with Bahia grass (*Paspalum notatum*) and managed in accordance with existing airfield vegetation standards.

## 2.2.4 Alternative 3 - Dredging of Wetlands to Create Lake

Alternative 3 would involve the dredging of approximately 112 acres (81.78 acres jurisdictional) in the south EOR wetland area to create a lake approximately 8 feet deep throughout. The lake would be situated on both sides of the runway approach light strip and would be connected by the existing culvert crossing the light strip. Spoil material from the dredging operation would be used to fill the southeastern corner wetlands (8.87 acres jurisdictional), while the remaining spoil would be disposed of in an approved solid waste management facility or through other lawful means. A French drain would be installed as described in Alternative 1 (**Section 2.2.2**) to catch storm water sheet flow from the airfield and runways north of the south EOR wetlands (see **Figure 2-2**). The resultant lake would be managed to keep the sides clear of vegetation and would minimize the habitat for large wading birds, such as egrets or herons. The area in the southeastern corner of the airfield would be planted in Bahia grass and would be managed in accordance with existing airfield vegetation standards.

## 2.2.5 Alternative 4 - Partial Dredge and Fill

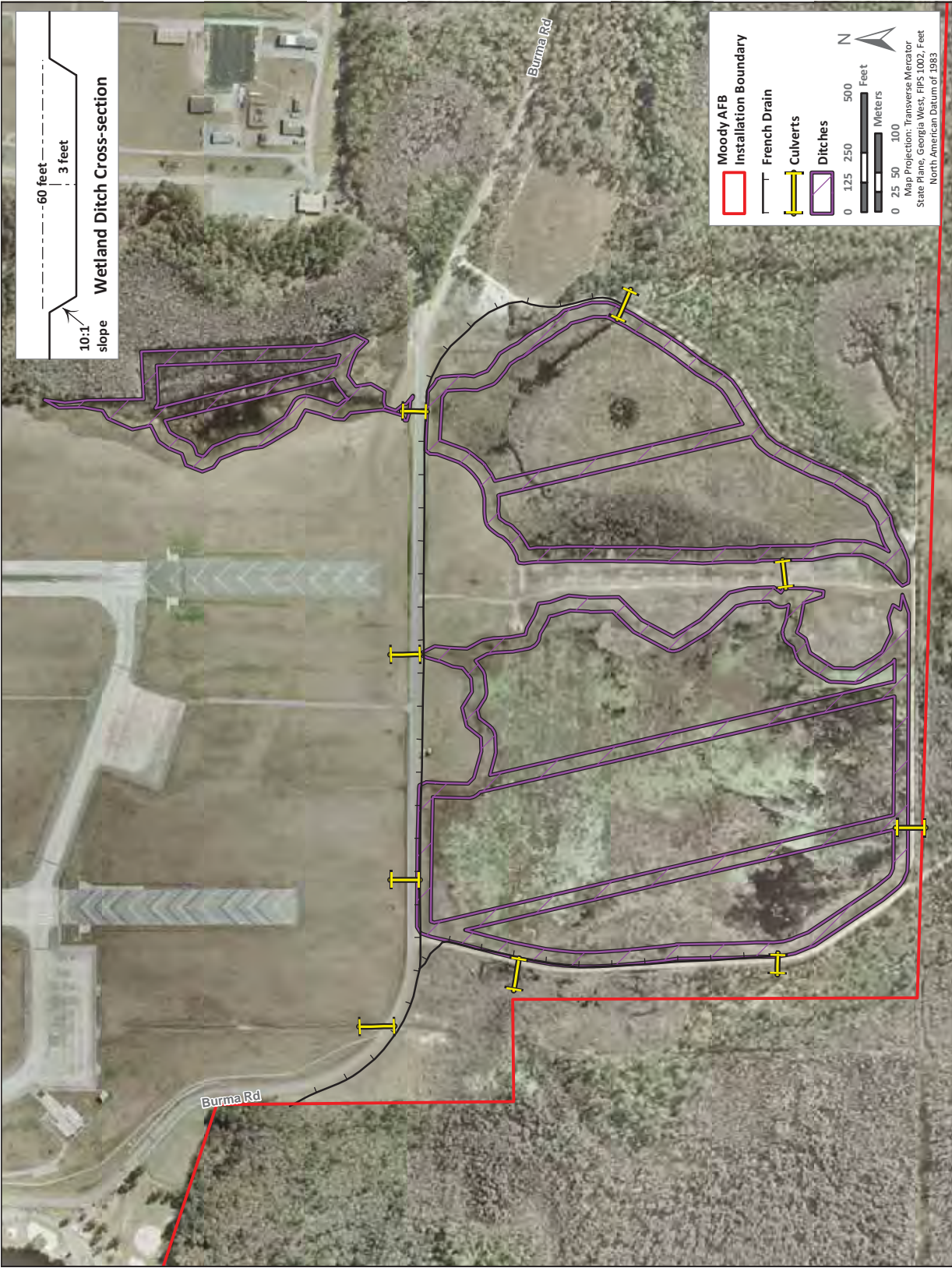
Under Alternative 4, the southern portion of the south EOR wetlands would be dredged to a depth of 8 feet, resulting in the creation of a 30-acre lake. Spoil from dredging the lake and additional clean fill sources would be used to fill the remaining portions of the south EOR wetlands and the southeastern corner wetland in order to convert them to upland. The lake would be situated on either side of the runway approach light strip and would be connected by the existing culvert crossing the light strip. The majority of the lake would be on the western side of the light strip. The outflow from the lake on the western side of the light strip would drain via the existing culvert south to Georgia Department of Natural Resources (DNR) property and via the existing culvert east across the light strip. Outflow from the portion of the lake on the eastern side of the light strip would be diverted through a new drainage ditch and culvert to the southeast. The edges of the lake would be managed to remove vegetation to minimize potential habitat for wildlife species. The resultant uplands would be planted with Bahia grass and would be maintained in accordance with existing airfield vegetation standards.

A French drain would be installed as described in Alternative 1 to catch storm water sheet flow from the airfield and runways north of the south EOR wetlands. An additional French drain would be installed along the eastern edge of Crash Trail 2 to divert drainage from the wetlands to the west of the south EOR wetlands into the 30-acre lake.

## 2.2.6 Alternative 5 – Increased Access and Vegetation Management

Alternative 5 involves a combination of increasing access to the wetland areas for USDA Wildlife Services staff and introducing alternative vegetation and management to the area to discourage high-risk bird species. An access road would be constructed within the south EOR wetlands to allow the wildlife control specialist to more effectively harass birds and wildlife, and to service propane cannons situated more centrally in the wetland habitats. The access road would be a dirt/gravel road, approximately 10 to 15 feet wide, and would extend east to west approximately 1,600 feet across the center of the south EOR wetlands from Crash Trail 2 to the runway approach light strip (see **Figure 2-4**). Alternative 5 would require placement of fill within the south EOR wetlands to create the access road. Culverts would be







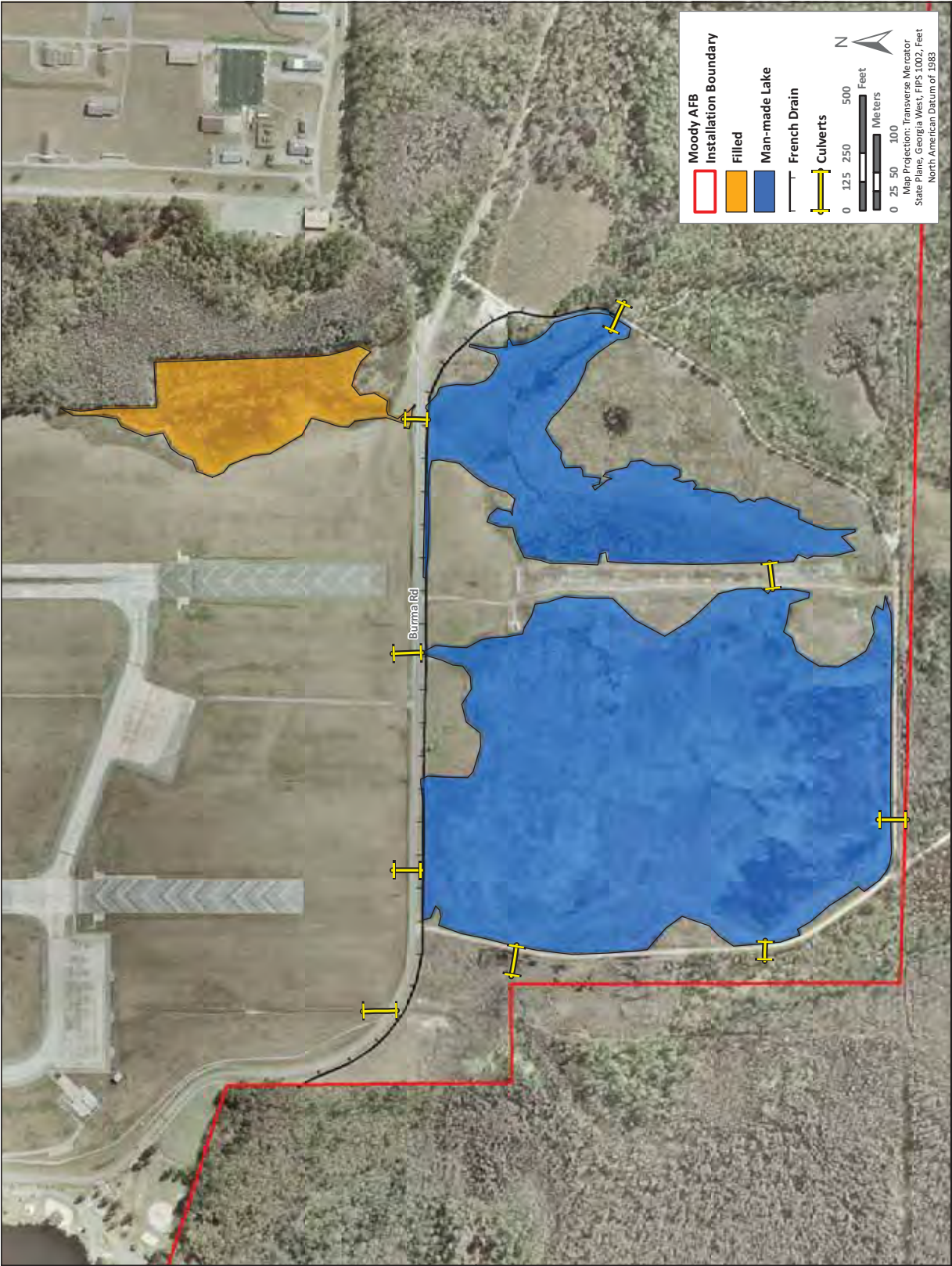


Figure 2-2. Alternative 3, Dredging of Wetlands to Create a Lake



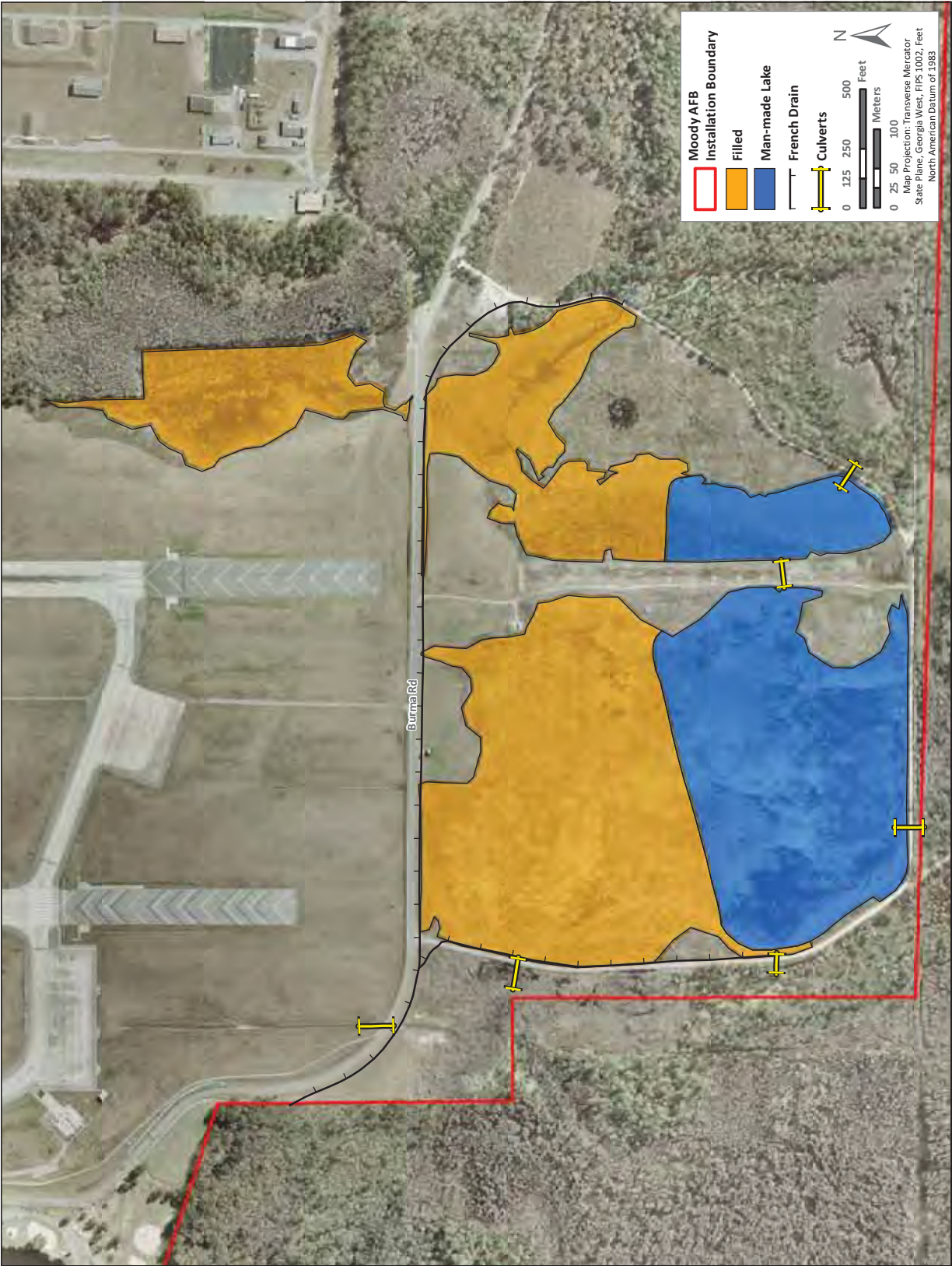


Figure 2-3. Alternative 4, Partial Dredge and Fill





Sources: Base Data and Aerial Photography: Moody AFB 2008; Access Road and Shrub Areas: eM, inc 2009.

Figure 2-4. Alternative 5, Increased Access and Vegetation Management

placed under the access road to maintain the existing drainage pattern within the ROI. The appropriate off-road equipment would also be acquired to increase access capabilities.

A significant reduction in wildlife attraction to the area might be achieved by introducing alternative vegetation such as titi (*Cyrilla racemiflora*). Titi is a native shrub that thrives in wetland conditions and forms a low and dense canopy. Under Alternative 5, titi would be planted throughout the south EOR wetlands and southeastern corner wetlands in staggered rows, covering approximately 120 acres, with the exception of the access road. Periodic maintenance to keep the new access road clear of titi would be necessary in order for the wildlife control specialist to effectively harass wildlife when necessary. Further efforts to reduce or eliminate cypress in the approach area would also reduce the need to cut trees that might grow into the clearance areas outlined in the Terminal Instrument Procedures criteria.

### 2.2.7 Alternative 6 - No Action Alternative

Under Alternative 6, the No Action Alternative, the south EOR and southeastern corner wetlands would not receive additional intensive management. Periodic herbicide treatments and prescribed burning would continue to be conducted to control vegetation in this area, as well as application of currently used BASH techniques to attempt to discourage wildlife use of the area.

## 2.3 Decision to be Made

Action Alternatives 1 through 5 meet the purpose of and need for the Proposed Action and the selection criteria discussed in **Section 2.2.1** and are, therefore, evaluated in detail in the EA. The No Action Alternative is also carried through the detailed analysis in the EA in accordance with NEPA and the CEQ and USAF regulations. The USAF has been faced with the decision of selecting one of the action alternatives, or to take no action.

The environmental impact analyses for four of the five action alternatives indicate that major adverse impacts on one or more resources of concern would occur if implemented. Therefore, if one of these four action alternatives were chosen, the USAF decisionmaker would need to determine if significant impacts would occur such that an EIS would be required. In this case, a Notice of Intent (NOI) to prepare an EIS would be issued and the EIS process would commence.

After careful consideration of the alternatives analysis contained in this EA, in addition to consideration of the potential success of each alternative weighed against the respective potential environmental impacts and other decisionmaking factors, the USAF has decided to adopt the No Action Alternative as its preferred alternative. Therefore, none of the action alternatives presented in this EA will be implemented without follow-on NEPA documentation taking place. Should the USAF decide in the future to implement one of the action alternatives, this EA would be supplemented and a new decision document signed, or this EA would serve to facilitate the EIS process [40 CFR 1508.9(a)(3)].

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### 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the characteristics of the affected environment and presents an analysis of the potential direct and indirect effects each alternative would have on the affected environment. Cumulative and other effects are discussed in **Section 4**. All potentially relevant resource areas were initially considered in this EA. Some were eliminated from detailed examination because of their inapplicability to the Proposed Action. General descriptions of the eliminated resources and the basis for elimination are described in **Section 3.1**.

As discussed in **Section 1**, the ROI for this EA includes the south EOR and southeastern corner wetlands (**Figure 1-2**).

The specific criteria used in this section for evaluating potential environmental effects associated with alternatives are presented under each resource area. The significance of an action is measured in terms of its context and intensity. The following elaborates on the nature of characteristics that might relate to various environmental effects.

**Short-term or long-term.** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term effects are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term effects are those that are more likely to be persistent and chronic, such as those caused by operational phases of a project.

**Direct or indirect.** A direct effect is caused by and occurs contemporaneously at or near the location of the action. An indirect effect is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct effect of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.

**Negligible, minor, moderate, or major.** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible effects are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate effect is readily apparent. A major effect is one that is severely adverse or exceptionally beneficial.

**Adverse or beneficial.** An adverse effect is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment. A single act might result in adverse effects on one environmental resource and beneficial effects on another resource.

**Significance.** Significant effects are those that, in their context and due to their intensity (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27).

**Context.** The context of an effect can be localized or more widespread (e.g., regional).

**Intensity.** The intensity of an effect is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Effects are also considered in terms of their potential for violation of Federal, state, or local environmental law; their controversial nature; the degree of uncertainty or



unknown effects, or unique or unknown risks; if there are precedent-setting effects; and their cumulative effects (see **Section 4**).

### 3.1 Impact Topics Excluded from Detailed Analysis

In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, the following evaluation of environmental impacts focuses on those resources and conditions potentially subject to effects, and on potentially relevant environmental issues deserving of study, and deemphasizes irrelevant issues. Some environmental resources and conditions that are often analyzed in an EA have been omitted from detailed analysis. The following provides the basis for such exclusions.

#### 3.1.1 Land Use

The ROI wetlands are within the critical clear zone area near the runways. The current land use designation for the ROI wetlands is airfield. The airfield presents serious land use constraints. Development is restricted within clear zones, runway, taxiway, and apron clearances so airfield operations can occur with minimal safety risks. However, none of the action alternatives proposed would interfere with the current land use designation for the airfield or its operation. Therefore land use is not evaluated in further detail in this EA.

#### 3.1.2 Cultural Resources

Neither the alternatives for implementing the Proposed Action, nor the No Action Alternative would physically alter, damage, or destroy any cultural resource or alter characteristics of the surrounding environment that contribute to the resource's significance. Accordingly, it has been determined that a detailed examination of cultural resources in this EA is not necessary.

The ROI is dominated by wetlands. Wetlands are poorly drained and most archeologists consider wetlands as having a low probability for the discovery of cultural and archeological resources; therefore, wetlands are normally considered to require only a visual inspection for these resources (GCPA undated). There have been no previous discoveries within or near the ROI that would cause concern that cultural and archeological resources would be discovered during the implementation of the Proposed Action. The 27 archeological sites on Moody AFB are not situated within or near the ROI. There have not been any surveys or investigations conducted that specifically sought out Traditional Cultural Resources or Sacred Sites on Moody AFB. Currently, Moody AFB does not have any Traditional Cultural Resources or Sacred Sites identified within its boundaries. The potential for an inadvertent discovery of cultural and archeological resources within the ROI during groundbreaking activities would be unlikely (MAFB 2006).

In the case that undiscovered cultural and archeological resources are discovered during the course of the Proposed Action, then the Standard Operating Procedure for emergency discovery would be implemented. The discoveries must immediately be reported to the Cultural Resource Manager at Moody AFB and the Section 106 process must be initiated. Additionally, the archeological site must be treated as potentially eligible for the NRHP under Section 106 until the Georgia State Historic Preservation Office (SHPO) has concurred that the site is not eligible, at which point USAF activity can continue (MAFB 2006).



### 3.1.3 Infrastructure

Neither the alternatives for implementing the Proposed Action, nor the No Action Alternative, would impact issues related to infrastructure. Although the ROI wetlands contain culverts, neither the Proposed Action nor alternatives would adversely affect these features. There are no utility corridors in the ROI wetland area. Therefore, it is determined that a detailed examination of infrastructure resources in this EA is not necessary.

### 3.1.4 Hazardous Materials and Wastes

Neither the alternatives for implementing the Proposed Action nor the No Action Alternative would impact issues related to hazardous waste. In addition there are no Environmental Restoration Program sites that would be affected. It is assumed that construction personnel would follow appropriate best management practices (BMPs) to protect against potential oil or fuel spills. Accordingly, a detailed discussion of hazardous waste is not included in this EA.

## 3.2 Noise

### 3.2.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a roof. Sound is measured with instruments that record instantaneous sound levels in decibels. A-weighted decibels (dBA) are used to characterize sound levels that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency content of a sound-producing event to represent the way in which the average human ear responds to the audible event. All sound levels analyzed in this EA are A-weighted.

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to one’s ears or as annoying noise. Affected receptors are specific (i.e., schools, churches, or hospitals) or broad areas (e.g., nature preserves or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

Cumulative noise levels, resulting from multiple single events, are used to characterize effects from aircraft operations. The cumulative Day-Night Average A-weighted Sound Level (DNL) is expressed in dBA and presented in the form of noise contours. DNL is a time-averaged noise metric, which takes into account both the noise levels of individual events that occur during a 24-hour period and the number of times those events occur.

**Federal Regulations.** The Federal government has established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. According to the USAF, the Federal Aviation Administration (FAA), and the U.S. Department of Housing and Urban Development criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the DNL noise exposure exceeds 75 dBA, “normally unacceptable” in regions exposed to noise between 65

and 75 dBA, and “normally acceptable” in areas exposed to noise of 65 dBA or less. For outdoor activities, the USEPA recommends a DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (FICON 1992).

In 1978, EO 12088, *Federal Compliance with Pollution Control Standards*, made the head of each Executive agency responsible for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under the control of the agency. The head of each Executive agency is responsible for compliance with applicable pollution control standards, which includes the Noise Control Act of 1972. “Applicable pollution control standards” means the same substantive, procedural, and other requirements that would apply to a private person under the Act. The Executive agency is responsible for submitting an annual plan for the control of environmental pollution, which shall provide for any necessary improvement in the design, construction, management, operation, and maintenance of Federal facilities and activities. The head of each Executive agency also ensures that sufficient funds for compliance with applicable pollution control standards are requested in the agency budget (EO 12088).

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed to is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

**Ambient Sound Levels.** Noise levels in residential areas vary depending on the housing density and proximity to parks and open space, major traffic areas, or airports. As shown in **Table 3-1**, noise levels in a normal suburban area have a DNL of about 55 dBA, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (Finegold et al. 1994).

Most people are exposed to sound levels of 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise effects on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below a DNL of 65 dBA (USEPA 1974). Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with effect assessments and that there is a consistent relationship between DNL and the level of annoyance.

**Table 3-1. Typical Outdoor Noise Levels**

DNL (dBA)	Location
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	City noise (downtown of major metropolitan area)
88	3rd floor apartment in a major city next to a freeway

Source: Finegold et al. 1994

**Construction Sound Levels.** Clearing and grading activities as well as building construction can cause an increase in sound that is well above the ambient level. A variety of sounds come from graders, pavers, trucks, welders, and other work processes. **Table 3-2** lists sound levels associated with common types of construction equipment that could be used under the Proposed Action. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

### 3.2.2 Description of the Affected Environment

The ambient sound environment at the ROI is dominated by noise from military aircraft operations. Since the ROI is just south of the runway, and within the clear zones, noise levels from aircraft operations are significant. Noise levels within the ROI exceed a DNL of 80 dBA. As shown in **Table 3-2**, noise levels above 80 dBA are typically found in the downtown section of a city or a third-floor apartment in a major city next to a freeway.

Roadways in the vicinity of the southern portion of Moody AFB include State Road-(SR) 125 (Bemiss Road), which is on the western side of Moody AFB. SR-221/31 is on the eastern side of the installation and traverses through the southeastern corner of the installation, by Bemiss Field. However, there is no access to the main installation from this road.

The State of Georgia does not have a statewide noise ordinance. Noise regulations are established and governed by the local municipalities. There are no regulations pertaining to noise from construction activities in Lowndes County.

**Table 3-2. Predicted Noise Levels for Construction Equipment**

Construction Category and Equipment	Predicted Noise Level at 50 feet (dBA)
<b>Clearing and Grading</b>	
Bulldozer	80
Grader	80–93
Truck	83–94
Roller	73–75
<b>Excavation</b>	
Backhoe	72–93
Jackhammer	81–98
<b>Building Construction</b>	
Concrete mixer	74–88
Welding generator	71–82
Pile driver	91–105
Crane	75–87
Paver	86–88

Source: FHWA 1980

### 3.2.3 Environmental Consequences

#### Evaluation Criteria

An analysis of the potential impacts associated with noise typically evaluates potential changes to the existing acoustical environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise effects were evaluated qualitatively for the alternatives considered.

#### Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches

Under Alternative 1, an increase in noise levels could originate from construction equipment and additional vehicle traffic.

**Construction Noise.** Short-term, minor, adverse effects are anticipated as a result of construction activities under Alternative 1. Noise from construction activities varies depending on the type of construction being done, the area that the project would occur in, and the distance from the source. Activities under Alternative 1 include clearing and the excavation and maintenance of ditches. To predict how these activities would affect populations, noise from the anticipated construction was estimated. For example, as shown in **Table 3-2**, clearing and excavation activities usually involve several pieces of equipment (e.g., bulldozers, backhoes, and trucks) that can be used simultaneously. Predicted noise levels at 50 feet away from the construction equipment that would most likely be used for Alternative 1 would range between 72 dBA and 94 dBA. Cumulative noise from the construction equipment at the ROI during the busiest day was estimated to determine the total effect of noise from activities at a given distance. Examples of expected construction noise levels for Alternative 1 (during daytime hours, Monday through Friday), as experienced by potential nearby sensitive receptors, are as follows:

- Persons accessing the buildings east of the wetlands, which are approximately 0.2 miles northeast of the ROI, would likely experience noise levels of approximately 46 to 67 dBA from construction activities.
- Persons in residential areas to the southwest of Moody AFB, which are approximately 0.8 miles west of the ROI, would likely experience noise levels of approximately 33 to 55 dBA from construction activities.

Implementation of Alternative 1 would have short-term, minor, adverse effects on the acoustical environment from the use of heavy equipment during construction activities. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Short-term noise increases generated from the construction activities in Alternative 1 would be minor in comparison to existing noise events from aircraft using the runway immediately north of the ROI, which already exceed a DNL of 80 dBA. Long-term, negligible to minor, adverse effects would also be expected from Alternative 1 due to periodic maintenance activities for sediment and vegetation removal within and along the ditches.

**Vehicular Noise.** Short-term, minor, adverse effects on the ambient acoustical environment are anticipated as a result of the increase in construction vehicle traffic under Alternative 1. Construction traffic would travel on SR-125 until entering the installation and then proceed to the south EOR wetlands.

As shown in **Figure 1-1**, the primary access to the south EOR wetlands would be SR-125. The additional traffic resulting from construction vehicles would likely cause minor increases in noise levels on noise-sensitive populations adjacent to the SR-125 roadway.

### **Alternative 2 – Complete Filling of Wetland Complex**

Alternative 2 would have effects similar to, but greater than, Alternative 1 on the ambient acoustical environment.

**Construction Noise.** Short-term, minor, adverse effects are anticipated as a result of construction activities under Alternative 2. Under Alternative 2, there would be more construction effort required as compared to Alternative 1; however, activities could occur over a longer time period. Construction activities under Alternative 2 include placement of fill within the south EOR and southeastern corner wetlands to completely fill the ROI, and excavation of a French drain. Predicted noise levels at 50 feet away from the construction equipment that would most likely be used for Alternative 2 (e.g., bulldozers, backhoes, and trucks) would range between 72 dBA and 94 dBA. Since the proposed sites under Alternative 1 and Alternative 2 are the same, noise levels on nearby sensitive receptors would be the same. However, noise levels from construction are estimated for activities at any given time. The noise levels that are heard can vary depending on the number of projects required under Alternative 2 and the timeline of the construction projects.

Implementation of Alternative 2 would have short-term, minor, adverse effects on the acoustical environment from the use of heavy equipment during construction activities. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Short-term noise increases generated from the construction activities in Alternative 1 would be minor in comparison to existing noise events from aircraft using the runway immediately north of the ROI, which already exceed a DNL of 80 dBA.

**Vehicular Noise.** Noise impacts from additional vehicle traffic under Alternative 2 would be similar to those presented under the Alternative 1. Vehicles would utilize the same access roads as vehicles under Alternative 1. Short-term, minor, adverse effects on the ambient environment are anticipated as a result of the increase in construction and personnel vehicle traffic under Alternative 2. Long-term, minor, adverse effects on the ambient environment are anticipated as a result of increased lawn mowing maintenance of the new grassland.

### **Alternative 3 – Dredging of Wetlands to Create Lake**

Alternative 3 would have short-term effects similar to Alternative 1 on the ambient acoustical environment. Long-term effects on the ambient acoustical environment from Alternative 3 would be less than those under Alternative 1, due to fewer maintenance activities.

**Construction Noise.** Short-term, minor, adverse effects are anticipated as a result of construction activities under Alternative 3. Construction activities under Alternative 3 would include excavation to create a lake and French drain. Alternative 3 would involve more excavation (dredging) activities in the short-term than Alternative 1, but would involve fewer maintenance activities requiring construction equipment over the long term. Predicted noise levels at 50 feet away from the construction equipment that would most likely be used for Alternative 3 (e.g., bulldozers, backhoes, and trucks) would range between 72 dBA and 94 dBA. Since the proposed sites under Alternative 1 and Alternative 3 are the same, noise levels on sensitive receptors would be the same. However, noise levels from construction are estimated for activities at any given time. The noise levels that are heard can vary depending on the number of projects under Alternative 3 and the timeline of the construction projects.



Implementation of Alternative 3 would have short-term, minor, adverse effects on the acoustical environment from the use of heavy equipment during construction activities. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Short-term noise increases generated from the construction activities in Alternative 3 would be minor in comparison to existing noise events from aircraft using the runway immediately north of the ROI, which already exceed a DNL of 80 dBA.

***Vehicular Noise.*** Noise impacts from additional vehicles under Alternative 3 would be similar to those presented under Alternative 1. Vehicles would utilize the same access roads as vehicles under Alternative 1. Short-term, minor, adverse effects on the ambient environment are anticipated as a result of the increase in construction and vehicle traffic under Alternative 3. Long-term, negligible, adverse effects on the ambient environment would be expected as a result of increased vehicle traffic entering the ROI for vegetation management activities.

#### **Alternative 4 – Partial Dredge and Fill**

Alternative 4 would have short-term effects similar to Alternative 1 on the ambient acoustical environment. Long-term effects on the ambient acoustical environment from Alternative 4 would be similar to those under Alternative 2, due to ongoing lawn mowing maintenance in the upland areas.

***Construction Noise.*** Short-term, minor, adverse effects are anticipated as a result of construction activities under Alternative 4. Alternative 4 would involve more filling and fewer dredging activities than those proposed under Alternative 3. Predicted noise levels at 50 feet away from the construction equipment that would most likely be used for Alternative 4 (e.g., bulldozers, backhoes, and trucks) would range between 72 dBA and 94 dBA. Since the proposed sites under Alternative 1 and Alternative 4 are the same, noise levels on sensitive receptors would be the same. However, noise levels from construction are estimated for activities at any given time. The noise levels that are heard can vary depending on the number of projects under Alternative 4 and the timeline of the construction projects.

Implementation of Alternative 4 would have short-term, minor, adverse effects on the acoustical environment from the use of heavy equipment during construction activities. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Short-term noise increases generated from the construction activities in Alternative 1 would be minor in comparison to existing noise events from aircraft using the runway immediately north of the ROI, which already exceed a DNL of 80 dBA. Alternative 4 would have fewer long-term effects than Alternative 1, since fewer maintenance activities would be required.

***Vehicular Noise.*** Noise impacts from additional vehicles under Alternative 4 would be similar to those presented under Alternative 1. Vehicles would utilize the same access roads as discussed under Alternative 1. Short-term minor adverse effects on the ambient environment are anticipated as a result of the increase in construction and vehicle traffic under Alternative 4. Long-term, negligible, adverse effects on the ambient environment would be expected as a result of increased vehicle traffic entering the ROI for vegetation management activities (e.g., removal of vegetation along lake edges and lawn mowing).

#### **Alternative 5 – Increased Access and Vegetation Management**

Alternative 5 involves mainly vegetation management, with very little excavation and construction involved. As such, Alternative 5 would have effects similar to, but less than, the other alternatives on the ambient acoustical environment. Short-term, negligible effects on the ambient environment are anticipated as a result of the increase in construction activities and vehicle traffic under Alternative 5.

Long-term, negligible to minor effects on the ambient environment are anticipated as a result of increased all-terrain vehicle use and BASH management-associated noises (e.g., cannons) within the ROI.

**Construction Noise.** Short-term, minor, adverse effects are anticipated as a result of constructing an access road within the south EOR wetlands under Alternative 5. Construction activities under Alternative 5 would consist mainly of vegetation clearing (e.g., pulling stumps), dredging, and placement of fill to construct the access road. Since the proposed sites under Alternative 1 and Alternative 5 are the same, noise levels on sensitive receptors would be similar; however, these noise disturbances are anticipated to be of a much lower duration and frequency than Alternatives 1 through 4.

Implementation of Alternative 5 would have short-term, minor, adverse effects on the acoustical environment from the use of heavy equipment during clearing and construction activities. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Short-term noise increases generated from the construction activities in Alternative 5 would be negligible in comparison to existing noise events from aircraft using the runway immediately north of the ROI, which already exceed a DNL of 80 dBA.

**Vehicular Noise.** Noise impacts from additional vehicle traffic under Alternative 5 would be less than those presented under each of the other action alternatives. Construction vehicles would utilize the same access roads as described under Alternative 1; however fewer vehicles would be expected because of the smaller construction needs associated with Alternative 5. Short-term and long-term negligible effects on the ambient environment are anticipated as a result of the increase in vehicle traffic under Alternative 5 from construction equipment and all-terrain vehicle use, respectively.

### **Alternative 6 – No Action Alternative**

Under the No Action Alternative, the ROI would remain unchanged. The acoustical environment described in **Section 3.2.2** would remain unchanged. No adverse effects on the ambient noise environment would occur under the No Action Alternative.

## **3.3 Air Quality**

### **3.3.1 Definition of the Resource**

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The type and amount of pollutants emitted into the atmosphere, the size and topography of the region, and the prevailing weather conditions determine air quality. The significance of the pollutant concentration is determined by comparing it to the Federal and state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety.

The 1970 Federal *Clean Air Act* (CAA), and the 1990 *Clean Air Act Amendments* (CAAA), regulate air pollution emissions from stationary and mobile sources to protect public health and welfare. Air quality regulations were first promulgated with the CAA and revised with the CAAA. Stationary sources at Moody AFB typically include fixed sources such as internal combustion engine generators, external combustion boilers, and spray paint booths. Mobile sources typically include motor vehicles, construction equipment, and aircraft.

The CAA and CAAA established the National Ambient Air Quality Standards (NAAQS) for the regulation of criteria pollutants. Criteria pollutants are chemical compounds that are known to have serious public health impacts, as well as cause damage to the environment in general. Designated state

and local agencies have the primary authority and responsibility to implement rules and regulations to control sources of criteria pollutants. Within the State of Georgia, the authority to regulate sources of air emissions resides with the Department of Natural Resources Environmental Protection Division. The criteria pollutants include ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), particulate matter equal to or less than 10 microns (PM<sub>10</sub>), and particulate matter equal to or less than 2.5 microns (PM<sub>2.5</sub>). In addition, volatile organic compounds (VOCs) and NO<sub>x</sub> pollutants are classified as O<sub>3</sub> precursors, and are subject to further regulations.

Based on measured ambient criteria pollutant data, the USEPA designates Air Quality Control Regions (AQCRs) of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. An AQCR is defined as a group of counties within a state, or counties from multiple states that share common geographical or pollutant concentration characteristics. An AQCR is often designated as unclassified when there are insufficient ambient criteria pollutant data for the USEPA to form a basis for attainment status. Once an AQCR is classified as nonattainment, the degree of nonattainment is divided into categories of marginal, moderate, serious, severe, or extreme. The assignment of a nonattainment category is based on measured criteria pollutant concentrations in a given location and varies according to the criteria pollutant of concern. **Table 3-3** presents the primary and secondary USEPA NAAQS, as well as the State of Georgia ambient air quality standards.

States are required to develop a State Implementation Plan (SIP) that sets forth how the CAAA provisions will be implemented within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

On March 10, 2009, the USEPA issued a proposed rule for mandatory greenhouse gas (GHG) reporting from large GHG emissions sources in the United States. The proposed rule was published in the Federal Register on April 10, 2009. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide (CO<sub>2</sub>) and other GHG emissions that can be used to inform future policy decisions. The proposed rule would require reporting of GHGs including CO<sub>2</sub>. Although GHGs are not currently regulated under the CAA, the USEPA has clearly indicated that GHG emissions and climate change are issues that need to be considered in future planning. GHGs are produced by the burning of fossil fuels and through industrial and biological processes.

### 3.3.2 Description of the Affected Environment

Moody AFB is in the Southwest Georgia Interstate AQCR in the counties of Lowndes and Lanier. The AQCR is in attainment or unclassified for all of the NAAQS. Moody AFB currently operates under a Synthetic Minor Air Quality Permit issued by the Georgia DNR, Environmental Protection Division, Air Protection Branch. This permit established practically enforceable emissions limitations such that the installation will not be considered a major source subject to Title V of the CAA. The actual point source emissions of criteria pollutants from the installation during 2005 were significantly less than the major source threshold of 100 tons per year (tpy).

### 3.3.3 Environmental Consequences

The Federal *de minimis* threshold emissions rates were established by USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to substantially affect air quality.

**Table 3-3. State of Georgia and National Ambient Air Quality Standards**

Pollutant	Averaging Time	National Standard		Georgia
		Primary	Secondary	
O <sub>3</sub>	1 Hour <sup>a</sup>	None	Same as Primary Standard	Same as National
	8 Hours <sup>b</sup>	0.08 ppm (157 µg/m <sup>3</sup> )		Same as National
	8 Hours	0.075 ppm <sup>g</sup>		Same as National
PM <sub>10</sub>	24 Hours <sup>c</sup>	150 µg/m <sup>3</sup>	Same as Primary Standard	Same as National
	Annual Arithmetic Mean <sup>d</sup>	None		50 µg/m <sup>3</sup>
PM <sub>2.5</sub>	24 Hours <sup>e</sup>	35 µg/m <sup>3</sup>	Same as Primary Standard	Same as National
	Annual Arithmetic Mean <sup>f</sup>	15 µg/m <sup>3</sup>		Same as National
CO	8 Hours <sup>c</sup>	9.0 ppm (10 mg/m <sup>3</sup> )	None	Same as National
	1 Hour <sup>c</sup>	35 ppm (40 mg/m <sup>3</sup> )		Same as National
NO <sub>2</sub>	Annual Arithmetic Mean	0.053 ppm (100 µg/m <sup>3</sup> )	Same as Primary Standard	Same as National
SO <sub>2</sub>	Annual Arithmetic Mean	0.030 ppm (80 µg/m <sup>3</sup> )	None	Same as National
	24 Hours <sup>c</sup>	0.14 ppm (365 µg/m <sup>3</sup> )	None	Same as National
	3 Hours <sup>c</sup>	None	0.5 ppm (1,300 µg/m <sup>3</sup> )	Same as National
Pb	Quarterly Average	1.5 µg/m <sup>3</sup>	Same as Primary Standard	Same as National

Source: USEPA 2008, State of Georgia 2006,

Notes:

Parenthetical values are approximate equivalent concentrations.

- The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is  $\leq 1$ . As of 15 June 2005, USEPA revoked the 1-hour ozone standard in all areas except 14 8-hour ozone nonattainment Early Action Compact Areas.
- To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
- Not to be exceeded more than once per year.
- To attain this standard, the expected annual arithmetic mean PM<sub>10</sub> concentration at each monitor within an area must not exceed 50 µg/m<sup>3</sup>.
- To attain this standard, the 3-year average of the 98<sup>th</sup> percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m<sup>3</sup>.
- To attain this standard, the 3-year average of the annual arithmetic mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m<sup>3</sup>.
- To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective 27 May 2008).

**Table 3-4** presents these thresholds by regulated pollutant. *De minimis* thresholds vary depending on the severity of the nonattainment area classification.

Based on current air quality monitoring data, the counties of Lowndes and Lanier as well as the remaining Southwest Georgia Interstate AQCR are in attainment for all criteria pollutants. Because the Proposed Action would occur in an attainment area, Federal General Conformity does not apply.

Federal prevention of significant deterioration (PSD) regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Class I area, and emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 microgram per cubic meter ( $\mu\text{g}/\text{m}^3$ ) or more (40 CFR 52.21(b)(23)(iii)). Moody AFB is not within 10 kilometers of a Class I area and the Proposed Action or reasonable alternatives to the Proposed Action would not cause an increase in the concentration of regulated pollutants in a Class I area; therefore, PSD is not applicable.

The Energy Information Administration states that in 2005, gross CO<sub>2</sub> emissions in Georgia were 185.7 million metric tons of CO<sub>2</sub> (EIA 2008). Approximately 6,731 metric tons of CO<sub>2</sub> were estimated to be emitted by Alternative 3, the highest CO<sub>2</sub> emitting alternative. Alternative 3 activities emit approximately 0.004 percent of the Georgia statewide CO<sub>2</sub>. Therefore, any one of the alternatives evaluated for this project would have negligible contribution towards the Georgia statewide GHG inventory. CO<sub>2</sub> emissions for each alternative are included in **Appendix E**.

**Table 3-4. Federal General Conformity *de minimis* Emissions Thresholds**

Pollutant	Status	Classification	<i>De minimis</i> Limit (tpy)
O <sub>3</sub> (measured as NO <sub>x</sub> or VOCs)	Nonattainment	Extreme Severe Serious Moderate/marginal (inside ozone transport region) All others	10 25 50 50 (VOCs)/100 (NO <sub>x</sub> ) 100
	Maintenance	Inside ozone transport region Outside ozone transport region	50 (VOCs)/100 (NO <sub>x</sub> ) 100
CO	Nonattainment/ maintenance	All	100
PM <sub>10</sub>	Nonattainment/ maintenance	Serious Moderate Not Applicable	70 100 100
PM <sub>2.5</sub> (measured directly, as SO <sub>2</sub> , or as NO <sub>x</sub> )	Nonattainment/ maintenance	All	100
SO <sub>2</sub>	Nonattainment/ maintenance	All	100
NO <sub>x</sub>	Nonattainment/ maintenance	All	100

Source: 40 CFR 93.153



The environmental consequences to local and regional air quality from a proposed Federal action are based on increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the effects in NAAQS attainment areas would be considered significant if the net increase in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Potential to cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP.

### Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the effects in NAAQS attainment areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP.

Effects on air quality in NAAQS nonattainment areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP.

With respect to the General Conformity Rule, effects on air quality would be considered significant if the proposed Federal action would result in an increase of a nonattainment or maintenance area's emissions inventory by 10 percent or more for one or more nonattainment pollutants, or if such emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area.

### Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches

Alternative 1 includes the creation of ditches and French drains to concentrate surface water in discrete areas and more effectively move surface water offsite via the existing outflow pattern. All areas where work will be done will be cleared prior to the commencement of those activities.

Short-term, minor, adverse impacts on air quality would be expected under Alternative 1. As stated previously, since the region is in attainment for all criteria pollutants, Federal General Conformity does not apply. **Table 3-5** compares combined point and area sources of the 2002 Air Emission Inventories for Lanier and Lowndes counties with the emissions estimated from Alternative 1. The estimated emissions from Alternative 1 do not represent an increase of 10 percent or more in the affected AQCR. The Southwest Georgia Interstate AQCR is composed of more than just Lowndes and Lanier counties, which means the percentage of regional emissions for Alternative 1 is actually less than indicated in **Table 3-5**. Air emissions calculations that served as the basis for this analysis can be found in **Appendix E**.

**Table 3-5. Alternative 1 Total 2010 Annual Emissions**

<b>Pollutant</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>VOC (tpy)</b>	<b>CO (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>
2002 County Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 1 Emissions	11.833	2.028	16.246	0.471	0.345
Alternative 1% of Regional Emissions	<b>0.179%</b>	<b>0.019%</b>	<b>0.030%</b>	<b>0.022%</b>	<b>0.003%</b>

**Alternative 2 – Complete Filling of Wetland Complex**

This alternative involves the filling of 120 acres of wetlands, some clearing, and the construction of a French drain and other ditches to catch storm water sheet flow from the airfield and runways.

Short-term, minor, adverse impacts on air quality would be expected under Alternative 2. Moody AFB is in an attainment area for all criteria pollutants; therefore, Federal General Conformity does not apply. **Table 3-6** compares combined point and area sources of the 2002 Air Emission Inventories for Lanier and Lowndes counties with the emissions estimated from Alternative 2. The estimated emissions from Alternative 2 do not represent an increase of 10 percent or more in the affected AQCR. Air emissions calculations that served as the basis for this analysis can be found in **Appendix E**.

**Table 3-6. Alternative 2 Total 2010 Annual Emissions**

<b>Pollutant</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>VOC (tpy)</b>	<b>CO (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>
2002 County Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 2 Emissions	47.325	7.854	63.639	1.828	1.329
Alternative 2% of Regional Emissions	<b>0.7185%</b>	<b>0.073%</b>	<b>0.116%</b>	<b>0.086%</b>	<b>0.012%</b>

**Alternative 3 – Dredging of Wetlands to Create a Lake**

Alternative 3 would involve dredging an area to create a lake (see **Figure 2-2**) on both sides of the runway approach light strip which would be connected by an existing culvert. The southeastern corner wetlands would be filled with the excess spoil material. A French drain would catch and divert storm water sheet flow from the runways and airfield to wetlands east of the ROI. All areas where work would be done would be cleared prior to the commencement of construction.

Short-term, minor, adverse impacts on air quality would be expected under Alternative 3. This alternative would occur in an attainment area for all criteria pollutants therefore Federal General Conformity does not apply. **Table 3-7** compares combined point and area sources of the 2002 Air Emission Inventories for Lanier and Lowndes counties with the emissions estimated from Alternative 3. The estimated emissions from Alternative 3 do not represent an increase of 10 percent or more in the affected AQCR. Air emissions calculations that served as the basis for this analysis can be found in **Appendix E**.

**Table 3-7. Alternative 3 Total 2010 Annual Emissions**

<b>Pollutant</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>VOC (tpy)</b>	<b>CO (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>
2002 County Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 3 Emissions	60.042	10.337	82.284	2.394	1.722
Alternative 3% of Regional Emissions	<b>0.910%</b>	<b>0.096%</b>	<b>0.154%</b>	<b>0.112%</b>	<b>0.016%</b>

#### **Alternative 4 – Partial Dredge and Fill**

The southern portion of the ROI would be dredged to create a lake with the spoil material used to fill the northern end of the complex and the southeastern corner wetland. The remaining wetlands within the ROI outside of the lake would be converted to uplands. The area would be cleared prior to the start of any of the other operations.

Short-term, minor, adverse impacts on air quality would be expected under Alternative 4. Alternative 4 would occur in an attainment area for all criteria pollutants therefore Federal General Conformity does not apply. **Table 3-8** compares combined point and area sources of the 2002 Air Emission Inventories for Lanier and Lowndes counties with the emissions estimated from Alternative 4. The estimated emissions from Alternative 4 do not represent an increase of 10 percent or more in the affected AQCR. Air emissions calculations that served as the basis for this analysis can be found in **Appendix E**.

**Table 3-8. Alternative 4 Total 2010 Annual Emissions**

<b>Pollutant</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>VOC (tpy)</b>	<b>CO (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>
2002 County Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 4 Emissions	47.612	8.126	66.357	1.899	1.376
Alternative 4% of Regional Emissions	<b>0.722%</b>	<b>0.075%</b>	<b>0.121%</b>	<b>0.089%</b>	<b>0.013%</b>

#### **Alternative 5 – Increased Access and Vegetation Management**

This alternative would increase access to the wetland areas for the USDA, Wildlife Services biologist to the area to discourage high-risk bird species. This would involve clearing to cut access corridors for the use of an all-terrain vehicle and planting the ROI area with titi.

Short-term, negligible, adverse impacts on air quality would be expected under Alternative 5. Alternative 5 would occur in an attainment area for all criteria pollutants therefore Federal General Conformity does not apply. **Table 3-9** compares combined point and area sources of the 2002 Air Emission Inventories for Lanier and Lowndes counties with the emissions estimated from Alternative 5. The estimated emissions from Alternative 5 do not represent an increase of 10 percent or more in the affected AQCR. Air emissions calculations that served as the basis for this analysis can be found in **Appendix E**.

**Table 3-9. Alternative 5 Total 2010 Annual Emissions**

<b>Pollutant</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>VOC (tpy)</b>	<b>CO (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>
2002 County Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 5 Emissions	5.131	1.363	7.294	0.227	0.601
Alternative 5% of Regional Emissions	<b>0.078%</b>	<b>0.013%</b>	<b>0.013%</b>	<b>0.011%</b>	<b>0.005%</b>

### **Alternative 6 – No Action Alternative**

Under the No Action Alternative, no additional intensive management of the ROI would occur. Periodic herbicide treatments and prescribed burning would continue to be conducted. Since this is an ongoing activity, there would be no change in emissions.

## **3.4 Socioeconomic Resources and Environmental Justice**

### **3.4.1 Definition of the Resource**

**Socioeconomics.** Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly characteristics of population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators are typically accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the “before” and “after” effects of any jobs created or lost as a result of a proposed action. Data on industrial or commercial growth or growth in other sectors provide baseline and trend line information about the economic health of a region.

In appropriate cases, data on an installation’s expenditures in the regional economy help to identify the relative importance of an installation in terms of its purchasing power and jobs base.

Demographics identify the population levels and changes to population levels of a region. Demographics data might also be obtained to identify, as appropriate to evaluation of a proposed action, a region’s characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

Socioeconomic data shown in this chapter are presented at census tract, county, municipality, and state levels to characterize baseline socioeconomic conditions in the context of regional and state trends. Data have been collected from previously published documents issued by Federal, state, and local agencies; and from state and national databases (e.g., U.S. Bureau of Economic Analysis’ Regional Economic Information System).



**Environmental Justice.** EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (11 February 1994) requires Federal agencies' actions substantially affecting human health or the environment not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was created to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies. Construction activities associated with the action alternatives would occur in the ROI and would be entirely on-installation. Off-installation minority and low-income populations, limited in size and proximity to the installation, would not be affected by the action alternatives considered. Therefore, consideration of environmental justice impacts will not be studied in detail.

### 3.4.2 Description of the Affected Environment

Moody AFB has approximately 5,500 military and civilian personnel. For the purposes of the socioeconomic analysis, Census Tracts 9502, 101.01, and 101.02 in both Lowndes and Lanier counties make up the study area for socioeconomic impacts related to the Proposed Action or reasonable alternatives to the Proposed Action. The ROI is contained within census tract 101.02 in Lowndes County.

Moody AFB contributes approximately \$116 million annually to the local economy through payroll expenditures. Additional expenditures of \$30 million are contributed to the local economy through service contracts and another \$7 million through local purchases. This results in approximately \$153 million contributed annually to the southeastern Georgia economy by Moody AFB.

As of March 2009, the State of Georgia had a 9.2 percent unemployment rate compared to an unemployment rate of 8.3 percent in February 2009 for the Valdosta, Georgia, Metropolitan area (BLS 2009a, BLS 2009b). The 2006 gross state product of Georgia was approximately \$215,128 billion (Baer 2008). **Table 3-10** presents employment types in the ROI, Lowndes and Lanier counties, and the State of Georgia. As would be expected there are a higher percentage of persons employed in the Armed Forces than in Lowndes and Lanier counties, and the State of Georgia. Education, health, and social services is the next largest employer in the ROI after the Armed Forces and is the largest employer in Lowndes and Lanier counties and the State of Georgia. The construction employment industry accounts for 5 percent of the total employment type in the ROI according to Census 2000 data.

### 3.4.3 Environmental Consequences

#### Evaluation Criteria

Construction expenditure impacts are assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates 10 employment positions might go unnoticed in an urban area, but could have considerable impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or a decrease in regional spending or earning patterns, they would be considered adverse. The action alternatives could have significant effects with respect to the socioeconomic conditions in the surrounding study area if it were to result in the following:

- Change the local business volume, employment, personal income, or population that exceeds the study area's historical annual change
- Adversely affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates.

**Table 3-10. Employment Type of Residents in Study Area, Lowndes County, Lanier County, and the State of Georgia**

<b>Economic and Social Indicators</b>	<b>Study Area</b>	<b>Lowndes County</b>	<b>Lanier County</b>	<b>State of Georgia</b>
Employed Persons in Armed Forces	22%	4.1%	2%	1.1%
Agriculture, forestry, fishing and hunting, and mining	2%	1.5%	5.2%	1.4%
Construction	5%	6.6%	12.1%	7.9%
Manufacturing	10%	11.8%	17.6%	14.8%
Wholesale trade	1.8%	3.5%	2.4%	3.9%
Retail trade	12%	15.8%	11.3%	12%
Transportation and warehousing, and utilities	4.7%	5.4%	6.6%	6.0%
Information	1.3%	2.3%	0.4%	3.5%
Finance, insurance, real estate, and rental and leasing	3%	4.2%	2.3%	6.5%
Professional, scientific, management, administrative, and waste management services	5%	6.6%	5.2%	9.4%
Educational, health and social services	21%	23.3%	18.4%	17.6%
Arts, entertainment, recreation, accommodation and food services	5.7%	8.8%	8.5%	7.1%
Other services (except public administration)	3.5%	4.5%	3.8%	4.7%
Public administration	5.5%	5.6%	8.2%	5.0%

Source: U.S. Census Bureau 2000a, U.S. Census Bureau 2000b

Note: Census 2000 data are the most recent comprehensive employment data for the ROI.

### **Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches**

Short-term, negligible, beneficial effects would be expected under Alternative 1. Proposed construction activities under Alternative 1 include creating ditches to channel water, installing French drains, and dredging portions of the wetlands. Associated construction activities would have short-term, negligible, direct, beneficial effects on local employment as it is assumed that local companies, materials, and supplies would be used.

Under Alternative 1, numbers of personnel in the study area are not expected to change from related construction activities. The limited short-term nature of the construction and new employment associated

with Alternative 1 would not have a significant effect on personal income, poverty levels, employment levels, or other demographic employment indicators in the study area.

### **Alternative 2 – Complete Filling of Wetland Complex**

The environmental consequences of Alternative 2 would be the same, or similar, to those of Alternative 1.

### **Alternative 3 – Dredging of Wetlands to Create Lake**

The environmental consequences of Alternative 3 would be the same, or similar, to those of Alternative 1.

### **Alternative 4 – Partial Dredge and Fill**

The environmental consequences of Alternative 4 would be the same, or similar, to those of Alternative 1.

### **Alternative 5 – Increased Access and Vegetation Management**

Negligible changes to the socioeconomic conditions would be expected under Alternative 5. Activities under Alternative 5 include creating access corridors for increased access and vegetation management techniques to discourage high-risk bird species. Path clearing would require only minimal construction activities and it is therefore assumed that fewer construction materials and associated personnel would be required under Alternative 5 than Alternatives 1 through 4.

### **Alternative 6 – No Action Alternative**

The No Action Alternative would result in continuation of the existing socioeconomic conditions, as discussed in **Section 3.4.2**. No additional effects on socioeconomic resources would be expected as a result of the action alternatives not being implemented at Moody AFB.

## **3.5 Aircraft Safety**

### **3.5.1 Definition of the Resource**

Aircraft safety is based on the physical risks associated with aircraft flight and current military operational procedures concerning aircraft safety. Historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures form consistent and repeated aspects of training for all aircrews, including Moody AFB airmen and other uses of the airspace within the ROI. Since the inception of the USAF in 1947, aircraft accidents have steadily declined each year.

The USAF has defined five classifications of aircraft mishaps: Classes A, B, C, D, and E (USAF 2008a). Class A mishaps result in a total cost in excess of \$1 million, a fatality or permanent total disability, or destruction or damage beyond economical repair to USAF aircraft. Class B mishaps result in a direct mishap cost totaling \$200,000 or more (but less than \$1 million), a permanent partial disability, or inpatient hospitalization of three or more personnel. This does not include individuals hospitalized for observation, diagnostic, or administrative purposes that were treated and released. Class C mishaps result in total damage that costs in excess of \$20,000 (but less than \$200,000), or any injury or occupational illness or disease that causes loss of one or more days away from work beyond the day or shift it occurred (called Lost Time). Class D mishaps result in any nonfatal injury or occupational illness that does not

meet the definition of Lost Time provided in AFI 91-204, Safety Investigations and Reports (USAF 2008a). Class E mishaps are those occurrences that do not meet reportable mishap classification criteria, but are deemed important to investigate and report for mishap prevention. Class E reports provide an expeditious way to disseminate valuable mishap prevention information. AFI 91-204 stipulates that a BASH event is any bird or wildlife strike to an aircraft that does meet Class A, B, or C mishap reporting criteria (USAF 2008a).

All military aircraft fly in accordance with Title 14 CFR Part 91, FAA *General Operating and Flight Rules*, which governs such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes when flying outside special use airspace. This regulation has precise requirements for the use of airports, heliports, and other landing areas; local flying rules; and special use airspace. Local flying rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. Altitudes for aircraft using special use airspace (SUA) are set to ensure the safest operating environment. Installation commanders may set different altitudes based on noise abatement, fly neighborly policies, or other safety considerations.

AFI 91-202, *The USAF Mishap Prevention Program*, implements Air Force Policy Directive 91-2, Safety Programs. It establishes mishap prevention program requirements (including BASH), assigns responsibilities for program elements, and contains program management information. The USAF devotes considerable attention to avoiding the possibility of bird/wildlife aircraft strikes. It has conducted a worldwide program for decades to study bird migrations, bird flight patterns, and past strikes to develop predictions of where and when bird/wildlife aircraft strikes might occur so as to avoid such incidents. Moody AFB developed a BASH Plan in order to control and minimize the collision potential between aircraft and wildlife in and around the immediate vicinity of Moody AFB airfields and training areas. The BASH plan established a Bird Hazard Working Group, Wildlife Hazard Warning System, airfield management procedures, and hazard deterrent and depredation methods (23 WG 2008).

Bird and wildlife strikes are an aircraft safety concern due to the potential damage that a strike might have on the aircraft or injury to aircrews. There are two main factors that influence the risk or potential for damage from a bird/aircraft strike: (1) the probability of a strike relative to the number of aircraft or birds in the operating environment; and (2) the mass (size) of the bird involved in the strike (MAFB 2003a). From 1985 to 2007, the Air Force Safety Center documented 76,451 wildlife strikes (AFSC 2007a). Of these, 42 resulted in Class A mishaps where the aircraft was destroyed, and 35 fatalities were recorded (AFSC 2007b). Therefore, 0.05 percent of all USAF wildlife strikes from 1985 to 2007 resulted in Class A mishaps. Bird/wildlife aircraft strike rates rise substantially as altitude decreases. Although birds can be encountered at altitudes of 30,000 feet and higher, approximately 50 percent of recorded bird/wildlife-aircraft strikes have been at altitudes lower than 400 feet and 92 percent of recorded strikes have occurred below 2,500 feet. Almost all strikes have been less than 15,000 feet (USAF 2007). During takeoff and landing, aircraft also face collision dangers from other types of wildlife, such as white-tailed deer and coyotes.

AFI 32-7064, *Integrated Natural Resources Management*, requires that all aspects of an installation's natural resources management be reviewed for potential wildlife hazards to aircraft operations. The land adjacent to aircraft operations areas must be managed to minimize attractions to wildlife. Surveillance of the land surrounding the airfield and coordination with adjacent landowners to reduce strike hazards are recommended. With respect to wetland management, AFI 32-7064 states that since wetland areas attract many wildlife species, thereby creating potential hazards to aircraft operations, innovative techniques to manage wildlife in wetlands should be explored and implemented. Legally defensible actions to reduce the amount of wetlands on the airfield to the maximum extent possible should be explored and pursued when their presence conflicts with the flight mission. According to AFI 32-7064, while "no net loss" of



wetlands is an important USAF goal, priority must be given to flight safety. A wetland mitigation bank as far from the active airfield as possible might present an opportunity to exchange marginal habitat near the runway for more pristine conditions where wildlife can thrive unencumbered by BASH initiatives.

For the purposes of this EA, aircraft safety is analyzed solely with respect to BASH threats in the ROI, as the intent of this Proposed Action is to reduce BASH threats at Moody AFB.

### 3.5.2 Description of the Affected Environment

A BASH risk exists at Moody AFB and its vicinity because of the presence of resident and migratory birds and other wildlife species (e.g., white-tailed deer, alligators, coyotes, and red fox). From approximately October 1992 to September 2003, Moody AFB aircraft have been involved in an average of 23.5 bird strikes annually, with a range from 12 to 35 strikes per year. These strikes have involved a variety of bird species including vultures, egrets, and passerines (MAFB 2003b). In support of the military mission, Moody AFB has implemented a BASH management program designed to minimize aircraft exposure to potentially hazardous wildlife strikes, especially birds, within the vicinity of the installation (MAFB 2003a). Data from a 3-year study (1995–1998) on bird movements in the Moody AFB operating environment were used to create a Bird Avoidance Model specifically for the Moody AFB airspace that is used to forecast high risk times, seasons, and areas. This Bird Avoidance Model, along with daily wildlife sighting reports and implementation of the BASH plan, is used to reduce BASH risk on Moody AFB (MAFB 2008a). **Table 1-1** shows the wetland-related birds strikes at Moody AFB occurring within or near the ROI since 1990. **Table 3-11** shows the damaging bird strikes by species at Moody AFB and associated costs from January 1990 to June 2009.

#### Problem Species

The primary wildlife species of concern at Moody AFB are large flocking birds and birds of large body size, which include European starlings and blackbirds, eastern meadowlarks, crows, egrets, sandhill cranes, and vultures. During the primary migration periods of spring and fall, large numbers of birds present a hazard at Moody AFB. Egrets, cranes, wood storks (*Mycteria americana*), and vultures are of particular concern due to their large body size and propensity to form large flocks. Large mammals such as coyotes and white-tailed deer also pose a BASH threat and were of particular concern in the past (MAFB 2003b).

**Vultures.** Both turkey vultures (*Cathartes aura*) and black vultures (*Coragyps atratus*) are year-round residents in southern Georgia; however, vulture populations vary throughout the year as a result of migration and overwintering. According to population estimates provided by the Georgia DNR, local vulture populations in the Grand Bay Wildlife Management Area (WMA), just south of the south EOR wetlands, consist of approximately 200 to 300 individuals. During the fall migration period, this population increases steadily to peak numbers of about 600 to 800 birds (MAFB 2003a). Vultures typically prefer areas of mixed woodland and open areas such as farmland (Kirk and Mossman 1998). Vultures generally roost in tall trees at Grand Bay WMA at night and begin their flight activity 1 to 2 hours after sunrise. The majority of black and turkey vulture flights occur at elevations less than 500 feet AGL during the morning, but increase in elevation after the development of thermal currents during the day. Large concentrations of vultures with up to 50 individuals are frequently observed during the winter, soaring over the south end of the airfield at heights up to 20,000 feet AGL. During approaches and departures to the runway, Moody AFB aircraft operate at the same elevations as these birds.

Vultures have been determined to be the second most hazardous bird for aircraft to strike, as determined by relative hazard to aircraft based on the percentage of strikes causing damage, strikes causing an effect-on-flight, and the cost per strike (Dolbeer et al. 2000). Dolbeer et al. (2000) determined that, from 1991

**Table 3-11. Damaging Bird Strikes by Species and Associated Costs at Moody AFB from January 1990 to June 2009**

Species	Number of Strikes*	Cost
American crow	1	\$330
Anhinga	1	\$211,000
Black vulture	4	\$139,687
Cattle egret	2	\$2,380
Chimney swift	2	\$26,179
Eastern meadowlark	2	\$75,752
Gray catbird	1	\$8,756
Great blue heron	2	\$77,884
Mississippi kite	1	\$9,000
Osprey	1	\$37,329
Passerine spp. ( unknown)	2	\$131,522
Prairie warbler	1	\$100,000
Red-eyed vireo	1	\$290
Red-tailed hawk	3	\$55,547
Red-winged blackbird	1	\$1,500
Savannah sparrow	1	\$6,600
Swainson's thrush	1	\$100
Swainson's thrush, yellow-billed cuckoo	1	\$6,756
Turkey vulture	5	\$354,316
Unknown	15	\$210,530
Vesper sparrow	1	\$2,000
White ibis	4	\$316,566
Yellow-billed cuckoo	1	\$33,616

Source: MAFB 2009

Note:

\* Number provided is the number of recorded incidents with species. One airstrike might have involved several individuals.

to 1998, 67 percent of vulture strikes caused damage, 40 percent had an effect-on-flight, and vultures ranked second in the cost per strike (Dolbeer et al. 2000, MAFB 2003b). According to the USAF strike database, black vultures and turkey vultures are currently ranked third and fourth for wildlife strikes by cost incurred, respectively (USAF 2008b).

The impact resistance of current and future generations of aircraft canopies cannot prevent penetration by species the size of a vulture. Additionally, impacts by vultures will nearly always cause significant damage to an aircraft airframe or engine. The military has recorded several cases of catastrophic strikes involving vultures. From 1990 to 2003, there have been 15 reported aircraft-vulture strikes at Moody AFB, the majority of which (73 percent) have involved turkey vultures. Because of the high frequency of

vulture-aircraft strikes, vultures are a safety concern for military pilots flying at low levels around Moody AFB. The 2002–2003 *Wildlife Hazard Assessment* for Moody AFB suggested reducing roost sites, prompt removal of dead animals, and harassment as effective methods for reducing vulture strike hazards (MAFB 2003b).

**Raptors (hawks, falcons, owls, and eagles).** Raptors were observed in 49 percent of all surveys during the 2002–2003 *Wildlife Hazard Assessment*, with an average of one bird seen per survey. The guild consisted of six different species, primarily red-shouldered hawks (40 percent), and American kestrels (31 percent). During the assessment, 62 birds from this guild were observed on Moody AFB. Most raptor species have characteristic hunting styles such as soaring, low-flying, hovering, and watching from perches and are only a threat to aircraft during the day. Only one owl (generally nocturnal) was observed during the assessment. Raptors at Moody AFB were most likely to be seen flying locally in woodland or short grass habitats. A survey station within the south EOR wetlands had the highest percentage of surveys in which a raptor was observed. The navigation lights in this area were observed to provide ideal perches from which to hunt (MAFB 2003b).

The large size and weight of most raptors make them a significant hazard to aircraft. The impact resistance of current generation canopies cannot prevent penetration by species of this size and raptors will nearly always cause significant damage to any part of an aircraft's airframe or engine (MAFB 2003b). Due to their large territories, raptors are, by nature, not an abundant guild. However, due to the amount of damage one individual can cause and the fact that species of this guild are prevalent in the ROI, raptors warrant a BASH concern.

**Wading Birds (herons, wood storks, egrets, ibis, and cranes).** Ten out of 18 recorded wetland-related bird strikes (56 percent) between 18 May 1993 and 3 July 2008 involved wading species (e.g., white ibis, snowy egret, great blue heron, little blue heron, great egret). Fifty percent (5 strikes) of these wading bird strikes involved white ibis (see **Table 1-1**).

Wading bird species were observed in 89 percent of the surveys during the 2002–2003 *Wildlife Hazard Assessment* and consisted primarily of cattle egrets (*Bubulcus ibis*), white ibis (*Eudocimus albus*), and sandhill cranes (*Grus canadensis*). Both cattle egrets and white ibis spend short periods flying each day to and from roosting areas. The extent and type of their activity and the resulting hazard to aircraft varies with season. At Moody AFB, the number of cattle egrets is greatest in July to August, the number of white ibis is greatest in November, and the number of sandhill cranes is greatest in January. Cattle egret and white ibis are only a threat to aircraft during the daytime, whereas sandhill cranes are active during both day and night. The impact resistance of current generation canopies cannot prevent penetration by birds of this size, and these species are large enough to cause severe damage to an aircraft's structure and engine. A total of 4,026 birds from this guild were observed during the assessment, with the average group size of 13. However, group sizes as high as 300 individuals were observed (MAFB 2003b).

The Grand Bay-Banks Lake wetland complex hosts Georgia's largest wintering population of sandhill cranes, totaling approximately 2,000 birds. Grand Bay proper is the focal point for this wintering population and also hosts nocturnal winter roosts of approximately 2,000 white ibis. In spring and summer, thousands of egrets, herons, and ibis nest in a dense rookery at the center of the bay. Grand Bay and adjoining marshes are important wintering habitat for American bitterns (*Botaurus lentiginosus*) and post-breeding staging habitat for wood storks (NAS 2009). Moody AFB has no permanent wood stork rookeries; however, wood storks are observed sporadically on the installation during the breeding season when habitat conditions are suitable for foraging. Wood storks have been observed in several places on Moody AFB including the south EOR wetlands (MAFB 2008a).

Cattle egrets nest and roost, sometimes in populations of more than 2,000 birds, immediately south of Moody AFB in the Grand Bay WMA and are common in southern Georgia from late spring through early fall. Cattle egrets are commonly seen on the Moody AFB airfield during this time. Cattle egrets are typically found in pastures and other grassy areas, where they feed on insects flushed from the grass. Cattle egrets typically leave their rookery in Grand Bay WMA just after dawn and disperse to the west and north in small flocks ranging from 2 to 30 birds. Egrets typically forage until mid-morning, return to the rookery, and then disperse again to forage in late afternoon. Most foraging and return flights occur below 250 feet AGL. The impact resistance of all current generation canopies prevents penetration by a bird this size; however, cattle egrets are large enough to cause significant damage to any part of an aircraft's structure or engine. In 1996, there were five reported strikes involving cattle egrets and Moody AFB aircraft; however, there was only one reported cattle egret strike between 1996 and 2003, which could be attributable to Moody AFB's proactive BASH management program. Even though strikes with Moody AFB aircraft are infrequent, the presence of a nearby cattle egret rookery is of great concern and leads to increased risk for Moody AFB pilots and aircraft (MAFB 2003a).

During the 2002–2003 *Wildlife Hazard Assessment*, runways, ramps, woodlands, agricultural fields, and short grass were observed to be the most frequently used habitats; and most individuals were observed flying overhead past the survey areas. Moody AFB is surrounded by swamps and agricultural fields and is therefore situated between foraging and roosting areas of these birds. Most of these birds fly below 500 feet AGL as they transition between foraging and roosting areas on a daily basis. This movement is generally in a north-south direction. Dolbeer et al. (2000) determined cranes spp. and herons spp. to be the 4th and 12th most hazardous species to aircraft, respectively. Effective control measures suggested in the 2002–2003 *Wildlife Hazard Assessment* include improving drainage to eliminate attractive wetlands, reducing insect and rodent populations in grassy areas, reducing vegetation that surrounds water, reducing grass mowing frequency, and using pyrotechnics in conjunction with other scare tactics (MAFB 2003b).

**Waterfowl (ducks, geese, and grebes).** Species in this guild were observed in only 28 percent of all surveys during the 2002–2003 *Wildlife Hazard Assessment*. Pied-billed grebes (*Podilymbus podiceps*) made up 64 percent of this guild. A total of 77 birds from this guild were observed, with a group size ranging from one to seven individuals. Waterfowl were most abundant in the winter months. Waterfowl sightings during the assessment were not only limited by season but also by habitat. Agricultural fields, woodlands, swamps, and reservoirs (Mission Lake) were the most common habitats with observed waterfowl. Due to their low occurrence at Moody AFB during the assessment, waterfowl are not considered a high risk hazard at this time. However, with the abundance of surrounding agricultural fields and bodies of water, there is potential for increased problems in the future. Grand Bay, south of the south EOR wetlands, provides habitat for several species and large populations of waterfowl. For example, a population of at least 700 nesting pairs of wood duck (*Aix sponsa*) uses the Grand Bay (NAS 2009). The resident Canada goose population in the United States has quadrupled from 0.5 million in 1984 to more than 2 million in 1998. The upward trend in goose strikes during the 1990s closely parallels this population trend. Nationally, the increasing resident Canada goose population probably represents the single most serious bird threat to aircraft safety. Dolbeer et al. (2000) determined that Canada geese are ranked third in the amount of damage caused during strikes and fourth in the number of strikes and strikes that result in effects on flights (Dolbeer et al. 2000).

**Blackbirds and Starlings.** Blackbirds and European starlings are common in Georgia. The various blackbird species found at Moody AFB include rusty blackbird (*Euphagus carolinus*), brewer's blackbird (*Euphagus cyanocephalus*), red-winged blackbird (*Agelaius phoeniceus*), eastern meadowlark (*Sturnella magna*), and the brown-headed cowbird (*Molothrus ater*). Blackbirds and European starlings are diurnal and gregarious, especially in winter when they form roosts, often in mixed-species flocks, in the thousands. A total of 917,753 birds from this guild were observed during the 2002–2003 *Wildlife Hazard Assessment* (MAFB 2003b). Flock size ranged from 1 to 500,000, with the average being 1,810. These



birds would leave their roost sites at sunrise and disperse across the airfield in a westward direction to nearby farm fields in massive flocks. This migration was repeated again in the evening as birds transitioned eastward back toward their nightly roost. For those birds that were not flying past the airfield, the most common behavior observed was local flying in wetland and agricultural field habitats. Resident birds were observed most frequently flying locally or perching and utilizing the habitats of buildings and structures, power lines, or utility poles. The risk of multiple bird-strikes is high when there are large flocks of these birds present on and around the airfield. The impact resistance of all current generation canopies prevents penetration by a bird of this size; however, the large flocks can be enough to cause significant damage to any part of an aircraft engine (MAFB 2003b).

### 3.5.3 Environmental Consequences

#### Evaluation Criteria

The flight safety issues that could result from implementation of the Proposed Action are evaluated based on the likelihood that the activity would negatively affect the safety of the public, military personnel, and property (both military and civilian). Flight safety concerns associated with the airspace currently used and proposed to be used by Moody AFB airmen includes aircraft mishaps and BASH issues. Alternatives were evaluated by comparing their ability or likelihood to reduce local numbers of species that pose potential hazards to aircraft, which is directly correlated with a reduction in BASH risk. In evaluating alternatives, the tradeoff between the reduction of existing hazardous species and the potential to attract new potentially hazardous species must be considered.

#### **Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches**

Long-term, negligible to minor, beneficial effects on flight safety would be expected if the concentration of surface water in ditches decreased surface water throughout the ROI. A reduction in surface water would be expected to decrease the amount of wading birds in the area that use the wetlands for foraging. Planting the ditches with floating-leaved aquatic vegetation could be expected to reduce the attraction to those wading birds that visually stalk prey (e.g., great blue heron, great and snowy egrets), as the vegetation would conceal prey. However, the wood stork, for example, does not stalk prey but rather feeds by tactolocation (Kirk and Mossman 1998); therefore, these plantings might not be able to prevent this species from using the south EOR wetlands as foraging habitat. Additionally, maintenance of the ditches and banks to prevent the establishment of emergent vegetation would also lessen their attraction to most wading birds. Drainage ditches at Moody AFB are generally an attractant to many bird species including herons, egrets, and waterfowl. These ditches are ideal feeding locations due to taller vegetation along water's edge, which provides hiding cover for birds as well as their prey. The lack of vegetation along the banks of the ditches could potentially attract different species of birds that prefer foraging on exposed mud, such as sandpipers. Ditches lined with rip rap could help prevent the growth of vegetation and are a difficult substrate for wading birds to walk on. Rip rap-lined ditches are used much less frequently on Moody AFB by wading birds and waterfowl. The 2002–2003 *Wildlife Hazard Assessment* recommended that all airfield ditches be lined with rip rap or sprayed with herbicides to manage vegetation growth and that ditches be routinely cleared of sediment (MAFB 2003b).

Reducing open water within the ROI would be expected to locally reduce the amount of wading birds and waterfowl using the ROI wetlands for foraging purposes. However, wetlands would still occur adjacent to the area, and Alternative 1 would alter only a fraction of the more than 13,000 acres of wetland in the Grand Bay-Banks Lake wetland complex. Alternative 1 would not be able to address the BASH risk from birds flying over the ROI, either traveling between patches of habitat or migrating. According to the 2002–2003 *Wildlife Hazard Assessment* for Moody AFB, the highest number of visual observations made

for wading birds, blackbirds and starlings, killdeer, raptors, insectivores (e.g., swallows, woodpeckers), and vultures were of these species flying locally in the area and flying overhead past the observation area. Species such as the cattle egret, sandhill crane, and white ibis do not roost within Moody AFB; therefore, this roosting habitat would still be present in the region regardless of the implementation of Alternative 1.

## **Alternative 2 – Complete Filling of Wetland Complex**

Long-term, negligible to minor, beneficial effects on aircraft safety would be expected from the filling of the south EOR wetland complex. Converting the wetlands to upland would be expected to locally reduce the amount of wading birds and waterfowl using the south EOR wetlands for foraging purposes. However, wetlands would still occur adjacent to the area, and Alternative 2 would remove only a fraction of the more than 13,000 acres of wetland in the Grand Bay-Banks Lake wetland complex. Alternative 2 would not be able to address the BASH risk from birds flying over the south EOR wetlands, either traveling between patches of habitat or migrating. According to the 2002–2003 *Wildlife Hazard Assessment* for Moody AFB, the highest number of visual observations made for wading birds, blackbirds and starlings, killdeer, raptors, insectivores (e.g., swallows, woodpeckers), and vultures were of these species flying locally in the area and flying overhead past the observation area. Species such as the cattle egret, sandhill crane, and white ibis, do not roost within Moody AFB; therefore, this roosting habitat would still be present in the region regardless of the implementation of Alternative 2.

Since more than half of recorded strikes have been with wading species, it would seem that converting these wetlands to upland would be beneficial and reduce BASH risk; however, certain wading bird species, such as the cattle egret and the white ibis, which have accounted for 50 percent of the bird strikes involving wading bird species, also frequent lawns for foraging. The creation of a lawn-like habitat could be expected to attract these species to the south EOR wetlands after conversion, as a new potential foraging habitat would be juxtaposed to the roosting habitat within the cypress swamps. Therefore, long-term, minor, adverse effects on aircraft safety could be expected from Alternative 2.

Upland could also be expected to attract other species of birds, such as raptors and vultures, which fly over grasslands in search of food. Other species, such as the eastern meadowlark, which has been involved in at least 22 airstrikes since 1990, could utilize the new grassland area for nesting and foraging habitat. Additionally, the grass mowing area at Moody AFB would increase, as the newly created upland would be maintained according to airfield specifications (e.g., grass height between 7 and 14 inches [23 WG 2008]). Mowing within the ROI would generally be expected to attract birds that feed on insects stirred up after mowing. (MAFB 2003b).

## **Alternative 3 – Dredging of Wetlands to Create Lake**

Long-term, minor to moderate, adverse effects on aircraft safety could be expected from Alternative 3. The creation of a lake in the ROI could serve as an attractant to several new potentially hazardous species, particularly waterfowl. Although the edges of the lake would be kept clear of vegetation to minimize attracting wading birds, certain species of waterfowl, such as the Canada goose (*Branta canadensis*), prefer minimal vegetation around water bodies. Due to their low occurrence at Moody AFB, waterfowl are not currently considered a high risk hazard to aircraft safety. However, with the abundance of surrounding agricultural fields and bodies of water, there is potential for increased hazards in the future, particularly if waterfowl populations increase or expand their range, as is currently being observed in Canada geese populations. Placing a lake of this size on Moody AFB directly adjacent to the runway could have highly adverse impacts on aircraft safety in the future if larger populations of resident Canada geese or other waterfowl species do begin inhabiting southern Georgia in the future. Additionally, the lake could also be expected to attract larger mammals, such as white-tailed deer.

Converting the wetlands to a lake would likely locally reduce the amount of wading birds using the south EOR wetlands for foraging purposes. However, wetlands would still occur adjacent to the area, and Alternative 3 would remove only a fraction of the more than 13,000 acres of wetland in the Grand Bay-Banks Lake wetland complex. Alternative 3 would not be able to address the BASH risk from birds flying over the south EOR wetlands, either traveling between patches of habitat or migrating. According to the 2002–2003 *Wildlife Hazard Assessment* for Moody AFB, the highest number of visual observations made for wading birds, blackbirds and starlings, killdeer, raptors, insectivores (e.g., swallows, woodpeckers), and vultures were of these species flying locally in the area and flying overhead past the observation area. Species such as the cattle egret, sandhill crane, and white ibis, do not roost within Moody AFB; therefore, this roosting habitat would still be present in the region regardless of the implementation of Alternative 3.

Converting the southeastern corner wetlands to upland could have long-term, negligible to minor, adverse and beneficial effects on aircraft safety. As discussed in Alternative 2, the new grassland habitat could potentially attract new hazardous species, such as raptors, vultures, cattle egrets, white ibis, and additional insect- and seed-eating bird species, resulting in long-term adverse effects. Also, as discussed in Alternative 2, long-term, negligible to minor, beneficial effects on aircraft safety could also be expected from the reduction of wetland-associated species in this area. Maintaining a uniform monoculture of Bahia grass within the new upland would minimize habitat diversity and seed-eating birds within the southeastern corner wetlands.

#### **Alternative 4 – Partial Dredge and Fill**

Impacts from the implementation of Alternative 4 would be similar to those of Alternatives 2 and 3. Long-term, minor to moderate, adverse effects on aircraft safety would be expected as a result of creating a 30-acre lake in the south EOR wetlands. Long-term, negligible to minor beneficial effects on aircraft safety might occur from the filling of approximately 60 acres within the south EOR wetland complex due to a reduction in wetland-associated species; however, as discussed under Alternative 2, creating grasslands within the ROI could still attract hazardous wading bird species (e.g., cattle egrets and white ibis) and additional hazardous species including raptors, vultures, and eastern meadowlarks.

Additionally, the 30-acre lake could attract several new potentially hazardous species, particularly waterfowl. The lake could serve as permanent habitat for waterfowl and as stopover habitat for migrating flocks. Alternative 4 would not address those species flying overhead to utilize adjoining patches of habitat or during migration periods. Therefore, long-term, minor, adverse effects on aircraft safety could be expected from Alternative 4, potentially outweighing the beneficial effects of reducing wetland-associated species.

#### **Alternative 5 – Increased Access and Vegetation Management**

Long-term, minor to moderate, beneficial effects on aircraft safety would be expected by increased access into the south EOR wetlands by the USDA Wildlife Services biologist. Current limited access to the wetland area hampers bird dispersal efforts. Improving access to the south EOR wetlands would allow the wildlife control specialist to more effectively implement ScareWars® System techniques and reduce BASH threats, resulting in long-term beneficial effects on aircraft safety.

Long-term, minor to moderate, beneficial or adverse effects on aircraft safety could be expected from vegetation management within the ROI. The introduction of alternative vegetation, such as titi, to the area would be expected to decrease the attractiveness of the south EOR wetlands to certain species, particularly larger wading birds and waterfowl, resulting in beneficial effects on aircraft safety. Titi forms a low and dense canopy that would reduce standing water and limit access to the ground for feeding

by larger bird species. Additionally, titi has relatively weak, flexible branches that would not support roosting or perching by larger bird species. This alternative would reduce the amount of open water in the area, which would also be expected to decrease attractiveness to open water species and wading birds.

Since the ROI is situated within a much larger wetland system, the modification of these wetlands might not result in the reduction of hazardous wildlife species that one might expect under this alternative. Hazardous bird species would still be expected to fly over the airfield when moving between the adjoining wetland habitats. Additionally, it is likely that this area, once planted with alternative vegetation, will still provide habitat that might be suitable for other potentially hazardous wildlife and could increase edge effect when juxtaposed to a differing habitat type.

Titi provides dense cover that certain bird species might actually prefer, particularly the red-winged blackbird (*Agelaius phoeniceus*), which can nest in dense vegetation, including shrubs, and has been found to nest in titi (Stowers et al. 1968, Meanley 1968). Blackbirds are involved in a relatively large portion of the strikes at Moody AFB, accounting for six strikes from 2000 to 2003 (MAFB 2003b). Although individually small in size, the red-winged blackbird is a flocking species and has been known previously to fly over the Moody AFB airfield in vast numbers. Titi is also favored browse by white-tailed deer and could actually increase deer numbers in the south EOR wetlands (Coladonato 1992). If vegetation management in Alternative 5 ultimately attracted different potentially hazardous wildlife species to the ROI, such as red-winged blackbirds and white-tailed deer, adverse effects on aircraft safety would result. Further investigation would be needed in order to determine whether planting titi or other alternative vegetation types would serve as an attractant to different species of birds and wildlife, thereby trading one BASH threat for another.

## **Alternative 6 – No Action Alternative**

Under the No Action Alternative, the south EOR and southeastern corner wetlands would not receive additional intensive management. No new impacts on aircraft safety would be expected. Long-term, minor to moderate, adverse effects on aircraft safety would continue as a result of an ongoing BASH threat in the ROI.

## **3.6 Water Resources**

### **3.6.1 Definition of the Resource**

Hydrology consists of the redistribution of water through the processes of evapotranspiration, surface runoff, and subsurface flow. Hydrology results primarily from temperature and total precipitation that determine evapotranspiration rates, topography which determines rate and direction of surface flow, and soil and geologic properties that determine rate of subsurface flow and recharge to the groundwater reservoir. Groundwater consists of subsurface hydrologic resources. It is an essential resource that functions to recharge surface water and is used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale.

Waters of the United States are defined within the CWA, as amended, and jurisdiction is addressed by the USEPA and the USACE. These agencies assert jurisdiction over (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable tributaries of traditional navigable waters that



are relatively permanent where the tributaries typically flow year-around or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into waters of the United States including wetlands. Encroachment into waters of the United States and wetlands requires a permit from the state and the Federal government. **Section 3.8** provides a discussion of wetlands occurring within the action areas and adjacent wetlands that might be affected by the actions being considered. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards, established by the CWA, occur. The CWA requires that states establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads (TMDLs) for the source(s) causing the impairment. A TMDL is the maximum amount of a substance that can be assimilated by a water body without causing impairment.

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. The living and nonliving parts of natural floodplains interact with each other to create dynamic systems in which each component helps to maintain the characteristics of the environment that supports it. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and a diversity of plants and animals. Floodplains provide a broad area to spread out and temporarily store floodwaters. This reduces flood peaks and velocities and the potential for erosion. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body (FEMA 1986).

Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by FEMA, which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, Floodplain Management, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of FEMA FIRMs, which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative.

### 3.6.2 Description of the Affected Environment

**Groundwater.** Moody AFB is located within the Georgia Coastal Plain. This region has two major groundwater bearing zones. The surficial aquifer system consists of fine to coarse sands, gravels, silt, clayey silts, and clays. Water quality is generally good, and yields are usually less than 50 gallons per minute (MAFB 2008a). The Floridan aquifer, the primary water-bearing unit in the area, consists primarily of carbonate rock (approximately 27 square miles) (MAFB 2000). Water quality is generally good and yields are plentiful, however, groundwater has naturally high concentrations of sulfate, hydrogen sulfide, and iron, which is attributable to the presence of the sulfate minerals gypsum and celestite in the host rock. Analysis of background water quality has confirmed that several metals occur naturally in the region surrounding Moody AFB. Detectable levels of barium, cadmium, copper, iron, manganese, and zinc occur in the groundwater. The Floridan aquifer furnishes almost all the local water for commercial, industrial, domestic, irrigation, and municipal use. The aquifer is typically encountered at a depth of 150 feet and is usually under artesian conditions (MAFB 2008a).

Moody AFB operates an internal water system that includes three wells near the water treatment plant. The three wells have a combined capacity of 94,800 gallons per hour (or approximately 1.5 million gallons per day [mgd]) and supply the main cantonment and family housing areas. In addition, there are seven additional wells throughout the installation. These wells provide water for fire protection, air conditioning, recreation, and personnel support in isolated areas (MAFB 2000). Moody AFB typically consumes 0.45 mgd of potable groundwater (MAFB 2008b).

**Surface Water.** Moody AFB is within the Suwannee River Basin, which discharges to the northeastern Gulf of Mexico. Major drainages in this basin that affect Moody AFB include the Withlacoochee River to the west and the Alapaha River to the east. A major feature of this basin is the Grand Bay-Banks Lake wetland complex, which partially occurs within the political boundaries of Moody AFB. Excluding the Okefenokee Swamp, the Grand Bay-Banks Lake wetland complex, which is composed of more than 13,000 acres, is the largest freshwater lake/swamp system in the coastal plain of Georgia. The complex is composed of several broad Carolina bays (1 to 4 miles across), collectively referred to as Grand Bay, and shallow lakes interconnected by cypress-black gum swamp. Open water in this area is primarily confined to Banks Lake, which occupies about 13 square miles. Only about 25 percent of Banks Lake has open water with the remainder characterized as shrub or wetland areas. Shiner Pond, which is a small open water area in the Grand Bay-Banks Lake wetland complex, is along the northern boundary of Moody AFB. The area is approximately 65 acres and includes large areas with cypress trees and other vegetative cover (MAFB 2007). Water flow through Grand Bay is generally to the southeast and south. There are several canals and natural streams in the area. The northern parts of Banks Lake and approximately one-third of the shrub swamp area known as Old Field Bay drain to the northeast into Mill Creek, a tributary of Big Creek, which discharges to the Alapaha River, and ultimately into the Suwannee River. A portion of Old Field Bay also drains into Shiner Pond. Between Old Field Bay and Grand Bay lies a system of open marsh and creek swamp. Watersheds from the two bays converge here to form Grand Bay Creek, the major surface water collector for the wetlands complex. Southern parts of Banks Lake and the remainder of Grand Bay drain to the southeast through Grand Bay Creek. Grand Bay Creek also flows into the Alapaha River (MAFB 2007).

Drainage across the south EOR wetlands on the western side of the light strip is from the northwest to the southeast and is directed through several ditches and culverts (see **Figure 2-1**). Surface water drainage in the south EOR wetlands on the eastern side of the light strip is directed by two culverts, one that crosses the light strip from the wetlands on the western side of the light strip and an additional culvert from the north, which transfers drainage from the southeastern corner wetlands to the south. Some sheet flow from the airfield and runways to the north of the south EOR wetlands is transferred through several drainage ditches and culverts into the south EOR wetlands. All surface water from the ROI drains to the east-southeast, eventually flowing into Grand Bay.

Water levels throughout the USAF-owned area of Grand Bay are controlled through a series of natural and artificial dikes along with a variety of water control structures and several spillways. The surface waters of the Grand Bay system are “blackwater” systems, and are characterized by very soft, poorly buffered, acidic waters (i.e., pH of 4.5 to 6.5) with relatively low fertility. The characteristic brown tint of these waters is caused primarily by the presence of high concentrations of humic acid (MAFB 2007). Storm water from the installation is discharged by a series of drainage ditches. Five major storm drain outfalls (culverts) occur along Burma Road, with water from these outfalls eventually draining into Mission Lake. Storm water from the northwestern section of the airfield forms the headwaters of Beatty Creek (MAFB 2007).

Water bodies present on the installation include Mission Lake, Quiet Pines Lake, and Shiner Pond. Mission Lake is an approximately 30-acre impoundment southwest of the parallel runways. It is the primary pond used for sport fishing at the installation. Quiet Pines Lake is an approximately 3-acre

impoundment in the vicinity of the golf course and housing area. Quiet Pines Lake is fed by a deep well (MAFB 2007). Shiner Pond is the only large open water area on Grand Bay Range. Shiner Pond is in the northwestern corner of Grand Bay Range immediately north of Shiner Pond Road. It is a 65-acre impoundment on the fringe of Old Field Bay and is part of the larger Banks Lake system. Shiner Pond was previously connected to Banks Lake by channels. The channels have been overgrown with shrubs and other vegetation (MAFB 2007).

Georgia DNR manages the impoundments and open wetland areas of the Grand Bay WMA, south of the ROI, primarily for the control of plant community succession and waterfowl habitat. This general management is accomplished through the manipulation of water levels and the use of fire. Water level management is performed through a series of water control structures, including riser pipes and culverts with flashboards. Water levels in Shiner Pond and Grand Bay are also controlled in this manner (MAFB 2007).

**Floodplains.** FEMA FIRMs covering Moody AFB, Community Panel No. 13185C0150E, effective September 26, 2008, show that the ROI is classified as Zone X, meaning that this area is outside of the 0.2 percent annual chance floodplain (FEMA 2008).

### 3.6.3 Environmental Consequences

#### Evaluation Criteria

Evaluation criteria for effects on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action would have significant effects on water resources if it were to do one or more of the following:

- Substantially reduce water availability or supply to existing users
- Overdraft groundwater basins
- Exceed safe annual yield of water supply sources
- Substantially adversely affect water quality
- Endanger public health by creating or worsening health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources.

The potential effect of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

#### Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches

Implementation of Alternative 1 would result in short-term, moderate, and long-term, major adverse impacts on water resources. Initially, the major concern of implementing Alternative 1 would be water quality issues arising from increased levels of turbidity in the water column during and just after completion of dredging activities. This impact would be short-term and localized. Water quality could also be locally impacted temporarily by any fluids leaked from dredging equipment. Proper maintenance of equipment would be conducted to minimize potential for leakage of fluids into adjacent waters.

Long-term, major, adverse impacts on water quality and damage to unique hydrologic characteristics would be expected from implementing Alternative 1. As water is directed towards the receiving wetland through French drains, a long-term, moderate adverse impact could result from a degradation of water quality and an increase in water velocity into the receiving wetland. Because wetlands act as natural

buffers for runoff that could contain contaminants, conveying airfield and runway runoff in a French drain could concentrate any contaminants into receiving water bodies. Wetlands act as natural water filters capable of improving water quality (NCSU 1996). Implementation of Alternative 1 would result in the receiving wetland experiencing a slight degradation of water quality due to potential pollutant runoff, as well as increased turbidity caused by increased runoff velocity. Airfield runoff could contain pollutants from equipment fluids, which would no longer enter the wetland and be naturally attenuated. Airfield runoff would be concentrated in the French drain and diverted into downgradient wetlands. Therefore, downgradient wetlands would receive concentrated runoff from the airfield and runway. This concentrated runoff would also be conveyed at a higher velocity than is the current condition for the receiving wetland because of the faster velocity induced by the impervious design of the French drain.

Alternative 1 would also convey increased water levels moving at a faster velocity into the receiving drainage ditch before reaching the receiving wetland. Once the faster moving water conveyed by the French drain comes into contact with slower moving water in the wetland, the decrease in energy would cause sediments within the water column to be deposited on the wetland bottom. Over time, this buildup of sediments could contribute to flooding events due to diversion of discharge from the drain and as a result of less space being available for water, especially during storm events. Moreover, a site-specific study concerning the receiving wetland should also be conducted to ensure that the wetland is capable of handling the quantity of water conveyed by the French drain.

Short-term, minor, adverse, impacts on water quality within the ditches could also occur once floating-leaved aquatic vegetation is planted. If vegetation adequately covers the water surface, sunlight would be blocked and photic vegetation will die. Once this occurs, decomposition would begin and dissolved oxygen levels could decrease as oxygen is consumed during the microbial decomposition process. If enough vegetation dies and decomposes, the water could become anoxic and no longer support biota. However, this could be minimized somewhat by the proposed movement of water offsite. Atmospheric oxygen becomes mixed into a stream at turbulent, shallow riffles, resulting in increased dissolved oxygen levels (UW 2003). Impacts from implementation of Alternative 1 on biological resources are discussed in **Section 3.9.3**.

Appropriate BMPs, such as good housekeeping, placement of drip pans under construction equipment, and sedimentation and erosion control measures (e.g., silt fences, sedimentation basins, seeding of disturbed areas and long-term soil stockpiles, vegetative buffers) would be implemented and would follow the guidelines provided in documents such as Moody AFB's Storm Water Pollution Prevention Plan (SWPPP), Integrated Natural Resources Management Plan (INRMP), the *Manual for Erosion and Sediment Control in Georgia* published by the Soil and Water Conservation Commission, and Federal and state permitting processes. Direct impacts on waters of the United States (see **Section 3.8**) would be avoided or minimized to the maximum extent possible and any required Section 404, 401, and state permitting for unavoidable impacts would be acquired prior to implementing the action. Impacts on groundwater supply are expected to be negligible.

## **Alternative 2 – Complete Filling of Wetland Complex**

Impacts of Alternative 2 would be greater on water resources than Alternative 1. Complete filling of the wetland complex would result in short-term moderate to major, and long-term, major impacts on water resources. Short-term impacts could occur from increased foot and vehicle traffic at the site, which could initially introduce contaminants into the water column. During filling activities, the water column would become more turbid, affecting water quality. Erosion and subsequent sedimentation of adjacent water bodies would be expected to occur until the site was sufficiently stabilized by vegetation. Appropriate BMPs would be implemented and would follow the guidelines provided in documents such as Moody AFB's SWPPP, INRMP, the *Manual for Erosion and Sediment Control in Georgia* published by the Soil



and Water Conservation Commission, and Federal and state permitting processes to minimize potential for adverse effects.

The long-term effect of filling the wetland could place an additional burden of absorption on surrounding lands. This can result in marginal uplands transforming into emergent wetlands and the existing wetland areas becoming wetter. In each wetland area, a certain volume of water can be absorbed during storm events and then slowly released through infiltration, runoff, plant absorption, evaporation, and the seasonal lowering of the water table (SCC undated). Filling of the wetland would initially remove this absorption ability, and the water volume conveyed to adjacent streams and wetlands would increase. Runoff could contain contaminants from the airfield and runway that could concentrate any contaminants into receiving water bodies. Because removing a wetland also removes the water filtering and pollutant removal processes that a wetland provides to an ecosystem, overall water quality of the area would be expected to degrade. As greater volumes of water at greater velocities are conveyed through the adjacent drainage ditch to the receiving wetland, erosion and sedimentation would be expected to increase. A buildup of sediments at the stream-wetland interface could occur over time, resulting in increased flooding potential.

Appropriate BMPs, as described in Alternative 1, would be implemented to minimize the impact of Alternative 2 on water resources to the extent possible. Direct impacts on waters of the United States (see **Section 3.8**) would be avoided or minimized to the maximum extent possible and any required Section 404, 401, and state permitting for unavoidable impacts would be acquired prior to implementing the action.

### **Alternative 3 – Dredging of Wetlands to Create Lake**

Dredging of wetlands to create a lake at the site would result in short-term, moderate and long-term, major impacts on water resources. Short-term, moderate impacts would be anticipated from increased foot and vehicle traffic at the site, which would result in increased erosion and sedimentation, temporarily causing increased turbidity in the water column. Pollutants from vehicle leakage could be transported in runoff and could enter adjacent water bodies, degrading water quality locally. Proper maintenance of equipment would be conducted to minimize potential for leakage of fluids into adjacent waters.

Changing the wetland into a lake would involve a major change in hydrologic characteristics. Creation of the lake and filling of the southeastern corner wetland would remove the natural pollutant removal processes performed by the wetland which could result in an overall degradation of water quality. Installation of the French drain would introduce impervious surfaces, increasing the velocity at which the airfield and runway runoff enters adjacent wetlands and streams. Also, the wetland would no longer attenuate pollutant runoff from the airfield, so pollutants would be concentrated and conveyed into receiving waters. These actions would degrade water quality by introducing pollutants into the water column as well as increasing turbidity.

Appropriate BMPs, as described in Alternative 1, would be implemented to minimize the impact of Alternative 3 on water resources to the extent possible. BMPs would be implemented and would follow the guidelines provided in documents such as Moody AFB's SWPPP, INRMP, the *Manual for Erosion and Sediment Control in Georgia* published by the Soil and Water Conservation Commission, and Federal and state permitting processes to minimize potential for adverse effects. Direct impacts on waters of the United States (see **Section 3.8**) would be avoided or minimized to the maximum extent possible and any required Section 404, 401, and state permitting for unavoidable impacts would be acquired prior to implementing the action.

#### **Alternative 4 – Partial Dredge and Fill**

Impacts from Alternative 4 would be similar to impacts associated with Alternatives 2 and 3. Short-term, moderate to major and long-term, major impacts would be expected from implementing Alternative 4.

Short-term impacts on water resources would result from increased foot and vehicle traffic at the site, which would result in increased erosion and sedimentation, temporarily causing increased turbidity in the water column. Pollutants from vehicle runoff could enter the water body, degrading water quality locally. Proper maintenance of equipment would be conducted to minimize potential for leakage of fluids into adjacent waters. Erosion and subsequent sedimentation of adjacent water bodies would be expected to occur until the site was sufficiently stabilized by vegetation.

Long-term, major impacts would be expected from changing the hydrologic characteristics of the site. These impacts include contaminated runoff entering adjacent streams and wetlands, the reduced potential for natural pollutant removal by wetlands, and increased water volume and velocity entering adjacent streams and wetlands. In addition, a buildup of sediments at the stream-wetland interface could occur over time, resulting in increased flooding potential.

Appropriate BMPs, as described in Alternative 1, would be implemented to minimize the impact of Alternative 4 on water resources to the extent possible. Direct impacts on waters of the United States (see **Section 3.8**) would be avoided or minimized to the maximum extent possible and any required Section 404, 401, and state permitting for unavoidable impacts would be acquired prior to implementing the action.

#### **Alternative 5 – Increased Access and Vegetation Management**

Alternative 5 would be expected to have the least impact on water resources besides the No Action Alternative. Short-term, minor, and long-term, negligible impacts would be expected on water resources from implementing Alternative 5. Increased foot and vehicle traffic into the site would increase erosion and sedimentation potential and runoff from vehicle fluids could introduce pollutants into the water during site preparation. Long-term, negligible impacts on water quality would be expected to occur due to ongoing vegetation maintenance and wildlife harassment activities. Minor erosion and sedimentation resulting from increased foot and vehicle traffic would also be expected to occur.

Culverts would be placed under the proposed access road in order to maintain the existing drainage pattern within the south EOR wetlands; therefore, localized flooding would not be expected from the construction of the access road. Proposed vegetation management under Alternative 5 would not impact water retention capacity of the ROI.

Appropriate BMPs, as described in Alternative 1, would be implemented to minimize the impact of Alternative 5 on water resources to the extent possible. Direct impacts on waters of the United States (see **Section 3.8**) would be avoided or minimized to the maximum extent possible and any required Section 404, 401, and state permitting for unavoidable impacts would be acquired prior to implementing the action.

#### **Alternative 6 – No Action Alternative**

No impacts would be expected. No change from current conditions at the site of the Proposed Action or reasonable alternatives to the Proposed Action would occur.

## 3.7 Geological Resources

### 3.7.1 Definition of the Resource

Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology.

Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland.

The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, as well as farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action is based on preparation of the farmland conversion impact rating form AD-1006 for areas where prime farmland soils occur and by applying criteria established at Section 658.5 of the FPPA (7 CFR 658). The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (see 7 CFR Part 658, 5 July 1984).

### 3.7.2 Description of the Affected Environment

#### **Regional Geology**

The regional geology of Moody AFB consists primarily of coastal plain sediments deposited onto the submerged shallow continental shelf, which was later exposed when the sea receded from this area. Rock units formed during the Mesozoic and Cenozoic Eras consist of Cretaceous marine sediments (sands and clays) and Tertiary marine deposits (siliceous strata with lignitic, sandy, and argillaceous deposits). The most important stratigraphic unit in the region is the Suwannee Limestone, which contains the upper

components of the Floridan Aquifer. The Suwannee Limestone ranges in thickness from approximately 200 to 250 feet and is usually less than 200 feet below ground surface (MAFB 2007).

Moody AFB is on the level plateau between the Withlacoochee River on the west and the Alapaha River to the east. The eastern section of the installation, which includes the Grand Bay Range, is primarily in a low area known as Grand Bay (MAFB 2007). Elevations on Moody AFB range from approximately 190 feet above mean sea level (MSL) in the eastern section of the installation to about 240 feet above MSL near the center of the installation. Slopes on Moody AFB range from 0 to 5 percent (MAFB 2007).

## Topography

Moody AFB is in the Tifton Upland District in the Georgia Lower Coastal Plain section of the Atlantic Coastal Plain Physiographic Province. The predominant landform on about 80 percent of the Georgia Lower Coastal Plain is characterized by moderately dissected, irregular plains of marine origin. The Tifton Upland District is characterized by flat to sloping plateaus separated by shallow river valleys, broad wetland depressions, and karst topography. **Figure 3-1** shows the topography on Moody AFB based on the U.S. Geological Survey (USGS) topographic maps for the Bemiss and Ray City quadrangles.

## Soils

The NRCS mapped soils in the vicinity of Moody AFB (NRCS 2009). Generally, soils in the region of Moody AFB consist of loamy sands and sands with mucks occurring in some wetland areas. Seventeen soil series or mapping units have been mapped on the Main Base section of Moody AFB. A detailed map showing the soil mapping units occurring within the ROI is included as **Figure 3-2**.

Soil units mapped at the site of the Proposed Action include the Mascotte sand, Olustee sand, Pelham loamy sand, Leefield loamy sand, and the Tifton-Urban land complex. The Mascotte sand, Olustee sand, and Pelham loamy sand have slopes ranging from 0 to 2 percent, are poorly drained, and formed from marine deposits. The Leefield loamy sand has slopes ranging from 0 to 2 percent, somewhat poorly drained, and formed from marine deposits. The Tifton-Urban land complex has slopes ranging from 0 to 5 percent, is well-drained, and formed from marine deposits.

**Prime Farmland.** Of the 5 soil units mapped within the two potential sites of the Proposed Action, 3 are considered to be a farmland of statewide importance (NRCS 2009). Soils considered farmland of statewide importance (the Mascotte sand, Olustee sand, and Leefield loamy sand) are classified as those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. However, because these soils are inundated, they are not used for agriculture. This area is not available for future agricultural use, and therefore would not meet the criteria for farmland of statewide importance.

**Geologic Hazards.** Geologic hazards are defined as a natural geologic event that can endanger human lives and threaten property. This includes earthquakes, landslides, sinkholes, tsunamis, and volcanoes.

No major geologic hazards exist for Moody AFB. This is because Georgia is located on a rifted passive margin of a continent, where there is a stable transition from the continental crust of North America to the oceanic crust of the Atlantic (University of Georgia undated). USGS has produced seismic hazards maps based on current information about the rate at which earthquakes occur in different areas and on how far strong shaking extends from the quake source. The hazard maps show the levels of horizontal shaking that have a 2 in 100 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of the force of gravity (percent g) and is proportional to the hazard faced by a particular type of building.



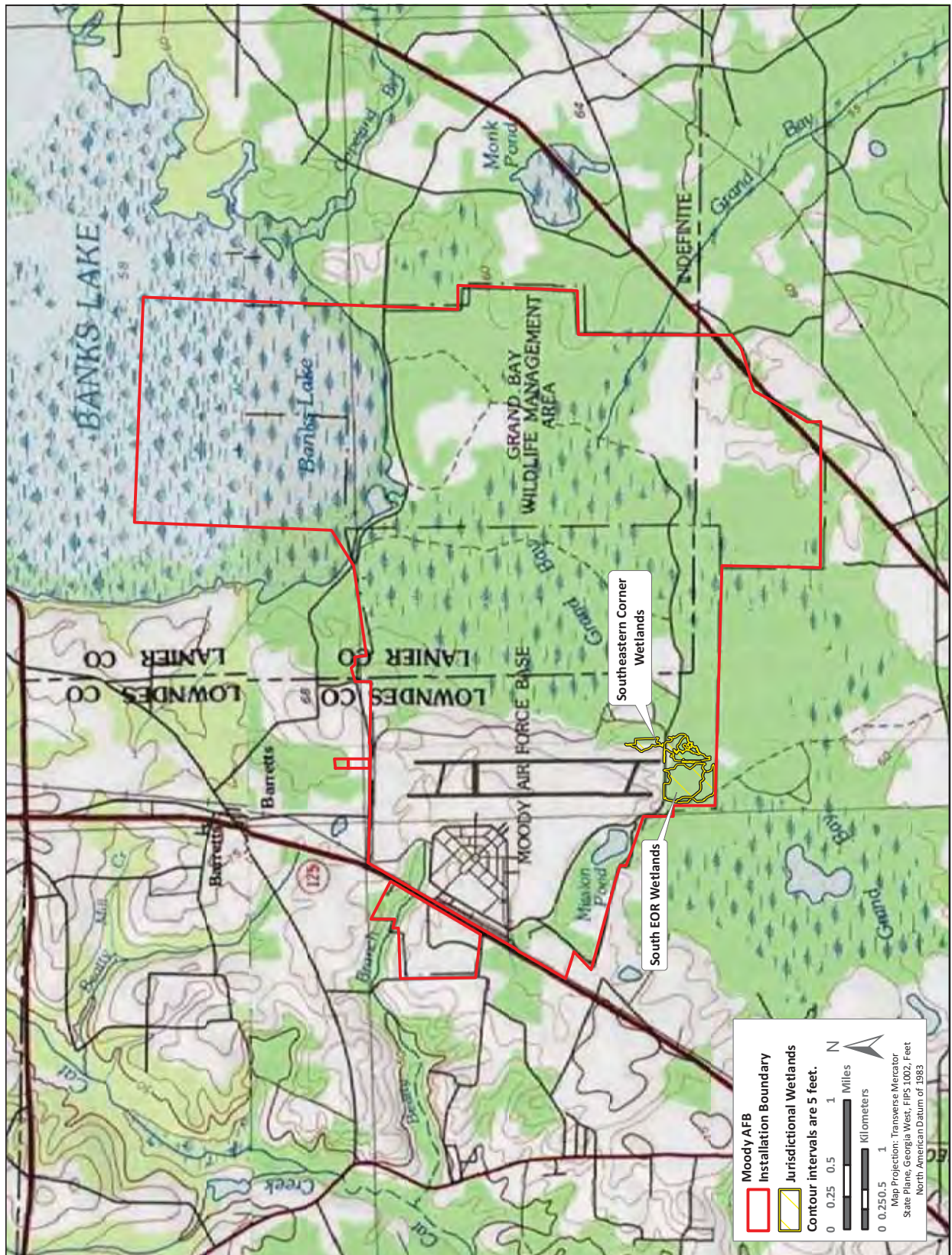


Figure 3-1. Topography at Moody AFB

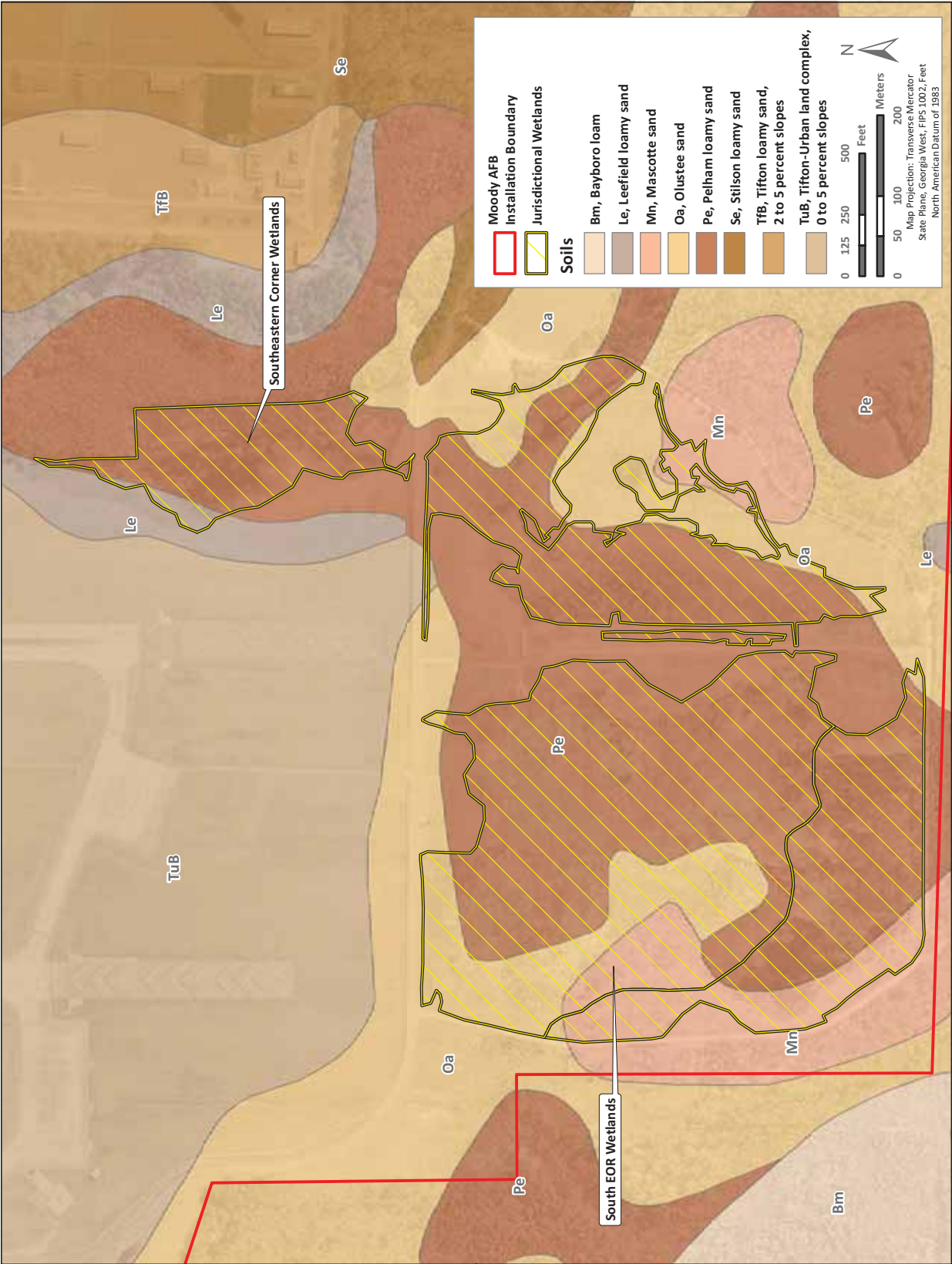


Figure 3-2. Mapped Soil Series at Moody AFB



In general, little or no damage is expected at values less than 10 percent g, moderate damage could occur at 10 to 20 percent g, and major damage could occur at values greater than 20 percent g. The 2008 United States National Seismic Hazards Map shows that the region of Moody AFB has a seismic hazard rating of 0.5 percent g (USGS 2009).

### 3.7.3 Environmental Consequences

#### Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development. Effects on geology and soils would be significant if they would alter the lithology, stratigraphy, and geological structures that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function (including prime farmland and other unique soils) within the environment.

#### Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches

Impacts on soils from implementing Alternative 1 would be short-term, minor to moderate and long-term, moderate, as soils would be dredged, removed, and altered to create a series of drainage ditches. Creating slopes in a 10 to 1 ratio for the ditch banks could increase erosion and sedimentation rates. The ditches will likely fill to the top of banks with water, so soils on the banks will be submerged. This would likely cause some slumping of the banks, suspension of soil in the water, and transport downstream where it would eventually come out of suspension and be deposited as sediment.

Vegetation that serves as an attractant to wildlife would be removed periodically; if this vegetation is the primary vegetation along the sides of the ditches, erosion and sedimentation rates could increase. Increased erosion and sedimentation rates would be exacerbated by diverting water to the southeast off of the installation, potentially leading to soil desiccation. Hydric soils could become desiccated if completely drained. This could change the functional characteristics of the soil from hydric and anaerobic to an upland more-aerated soil, affecting soil chemistry characteristics.

Increased sedimentation could result in increased maintenance of culverts to remove buildup of sediment. Short-term, minor to moderate impacts would be expected from soil compaction associated with increased foot and vehicle traffic for French drain installation. Site-specific soil surveys and geotechnical surveys would need to be completed prior to implementation of Alternative 1 to determine feasibility.

Soil erosion- and sediment-control measures would be included in site plans to minimize long-term erosion and sediment production at each site. As stated in the Moody AFB INRMP, land management and grounds maintenance activities goals for the installation include continued incorporation of erosion- and sediment-control provisions and accompanying environmental documentation for construction and land-disturbing project specifications. Nonpoint source pollution would be mitigated by implementing erosion- and sediment-control practices around construction sites in accordance with the Georgia Erosion and Sediment Control Act and the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater regulations (MAFB 2008a).

Construction BMPs would be implemented to minimize soil erosion; therefore, no significant adverse impacts on the soils at the site of the Proposed Action are anticipated. BMPs could include installing silt

fencing and sediment traps, and revegetating disturbed areas as soon as possible after disturbance, as appropriate.

### **Alternative 2 – Complete Filling of Wetland Complex**

Impacts on soils from implementing Alternative 2 would be short-term, minor to moderate and long-term, minor to moderate adverse, as the soil structure, composition, and function of the 90.65 acres to be filled would be altered. This would change the existing soil coverage from the soil units mapped at the site to urban land. The Tifton-Urban land complex is currently previously disturbed, and therefore this soil would only incur minor impacts by implementing the Proposed Action or reasonable alternatives to the Proposed Action. By covering the existing soil with clean fill, soil structure would be disturbed and compacted, and drainage characteristics would change. Creating a well-drained layer of fill atop poorly drained soils would introduce a subsurface layer of hydric soils; any contaminants from storm water runoff could percolate through the well-drained fill and accumulate in poorly drained soil (see **Section 3.6**). There could be an impact on previously undisturbed soils associated with removal of soil to be used as fill, depending on from where the fill was taken.

Erosion and sedimentation rates would increase until the fill has been stabilized with vegetation. Implementing the erosion- and sediment-control practices in accordance with the Georgia Erosion and Sediment Control Act and the NPDES Phase II Stormwater regulations would minimize soil impacts from Alternative 2. BMPs would be implemented to minimize the impacts of soil erosion prior to vegetation of fill. Vegetation would occur as soon as possible after disturbance, as appropriate. The amount of soil disturbance and fill needed to implement the action would be based on elevation of fill necessary to create the upland habitat

### **Alternative 3 – Dredging of Wetlands to Create Lake**

Impacts on soils from implementing Alternative 3 would be short-term, minor to moderate and long-term, moderate adverse as soil structure and function would be altered. Dredging to a depth of 8 feet would result in short-term, minor to moderate impacts on soils as increased foot and vehicle traffic would compact soils surrounding the site. Long-term, moderate adverse impacts would occur as a result of altered soil stratigraphy and soil productivity. A site-specific soil survey and geotechnical survey would be necessary to determine if engineering limitations exist and if any soil contamination is present that could potentially be released into the water column during dredging activities. See **Section 3.6.3** for an evaluation of impacts from Alternative 3 on water resources. Implementing the erosion- and sediment-control practices in accordance with the Georgia Erosion and Sediment Control Act and the NPDES Phase II Stormwater regulations would minimize soil impacts from Alternative 3.

### **Alternative 4 – Partial Dredge and Fill**

Impacts on soils from implementing Alternative 4 would be short-term, minor to moderate and long-term, moderate adverse as soil structure, composition, and function would be altered. Short-term, minor to moderate adverse impacts would be realized as increased foot and vehicle traffic would compact soils and increase erosion and sedimentation as vegetation is inadvertently destroyed during construction activities. Long-term impacts would occur from dredging and fill activities. Dredging would alter soil stratigraphy and drainage characteristics. Filling of the wetlands would change soil stratigraphy and cause compaction of soils. Creating a well-drained layer of fill atop poorly drained soils would introduce a subsurface layer of hydric soils. Erosion and sedimentation rates would increase until the fill has been stabilized with vegetation. Increased sedimentation could result in increased maintenance of culverts and French drains to remove buildup of sediment. A site-specific soil survey should be conducted to determine if engineering limitations exist and if any soil contamination is present that could potentially be released



into the water column during dredging activities. In addition, geotechnical surveys should be completed prior to implementation of Alternative 4 to determine if dredging is feasible for implementing this alternative. Implementing the erosion- and sediment-control practices in accordance with the Georgia Erosion and Sediment Control Act and the NPDES Phase II Stormwater regulations would minimize soil impacts from Alternative 4. BMPs should be implemented to minimize soil erosion; therefore, no significant adverse impacts on the soils at the site are anticipated. BMPs could include installing silt fencing and sediment traps.

### **Alternative 5 – Increased Access and Vegetation Management**

Implementing Alternative 5 would result in long-term, minor to moderate impacts on soils. Clearing of vegetation would increase erosion and sedimentation potential. Soil compaction and disturbance from vehicle traffic during project implementation could result in localized changes in drainage patterns. Implementing the erosion- and sediment-control practices in accordance with the Georgia Erosion and Sediment Control Act and the NPDES Phase II Stormwater regulations would minimize soil impacts from Alternative 5. Increased erosion and sedimentation could result in increased maintenance of culverts and French drains to remove buildup of sediment. Soil erosion and sediment production would be minimized as a result of following an approved sediment-and-erosion control plan, in addition to the introduction of alternative vegetation such as titi. See **Section 3.9.3** for a discussion of the impacts of Alternative 5 on vegetation.

### **Alternative 6 – No Action Alternative**

No effects would be expected. Implementation of the No Action Alternative would not entail any surface-disturbing activities at the sites being considered under the Proposed Action and reasonable alternatives to the Proposed Action.

## **3.8 Wetlands**

### **3.8.1 Definition of the Resource**

The USACE and the USEPA jointly define wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (USACE 1987).

Wetlands are protected as “waters of the United States” under Section 404 of the CWA. The term “waters of the United States” incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Jurisdictional waters of the United States regulated under the CWA include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, and “other” waters that, if degraded or destroyed, could affect interstate commerce. Wetlands are protected under EO 11990, *Protection of Wetlands* (43 Federal Register 6030). The purpose of the EO is to reduce adverse impacts associated with the destruction or modification of wetlands.

In accordance with AFI 32-7064, *Integrated Natural Resources Management*, the USAF must demonstrate that there are no practicable alternatives to construction within wetlands. The USAF is required to identify and locate jurisdictional wetlands and other waters of the United States that occur in areas where the resources have the potential to be impacted by military mission activities. The Federal government, including the Department of Defense (DOD), operates on a policy of “no net loss” of wetlands, meaning operations and activities shall avoid the net loss of size, function, or value of wetlands.

Section 404 of the CWA prohibits the discharge of dredged or fill material into wetlands, streams, and other waters of the United States unless a permit is issued by the USACE or an approved state. When there is a proposed discharge, all appropriate and practicable steps must first be taken to avoid and minimize impacts on aquatic resources. For unavoidable impacts, compensatory mitigation is required to replace the loss of wetland, stream, or other aquatic resource functions. The USACE is responsible for determining the appropriate form and amount of compensatory mitigation required (USACE Savannah District 2008a). Encroachment into wetlands or other waters of the United States also requires a permit from the state and the Federal government. A Section 401 Water Quality Certification is required for activities that require Federal permits such as a Section 404 permit. Georgia operates Section 401 Water Quality Certification in conjunction with the USACE via a Memorandum of Agreement that provides for a joint application process. A copy of the application for a Section 404 permit is automatically sent by USACE to the Georgia Environmental Protection Division for State Section 401 Water Quality Certification (Georgia DNR 2008a).

Determination of the occurrence and extent of jurisdictional wetlands and other waters of the United States for Moody AFB was based on the application of procedures established in the USACE *Wetlands Delineation Manual*, Technical Report Y-87-1 (USACE 1987). Determination of the occurrence of jurisdictional wetlands was based on the presence or absence of hydrophytic vegetation, hydric soils, and wetland hydrology. The presence of all three of the criteria is necessary for an area to be designated as a jurisdictional wetland under normal conditions.

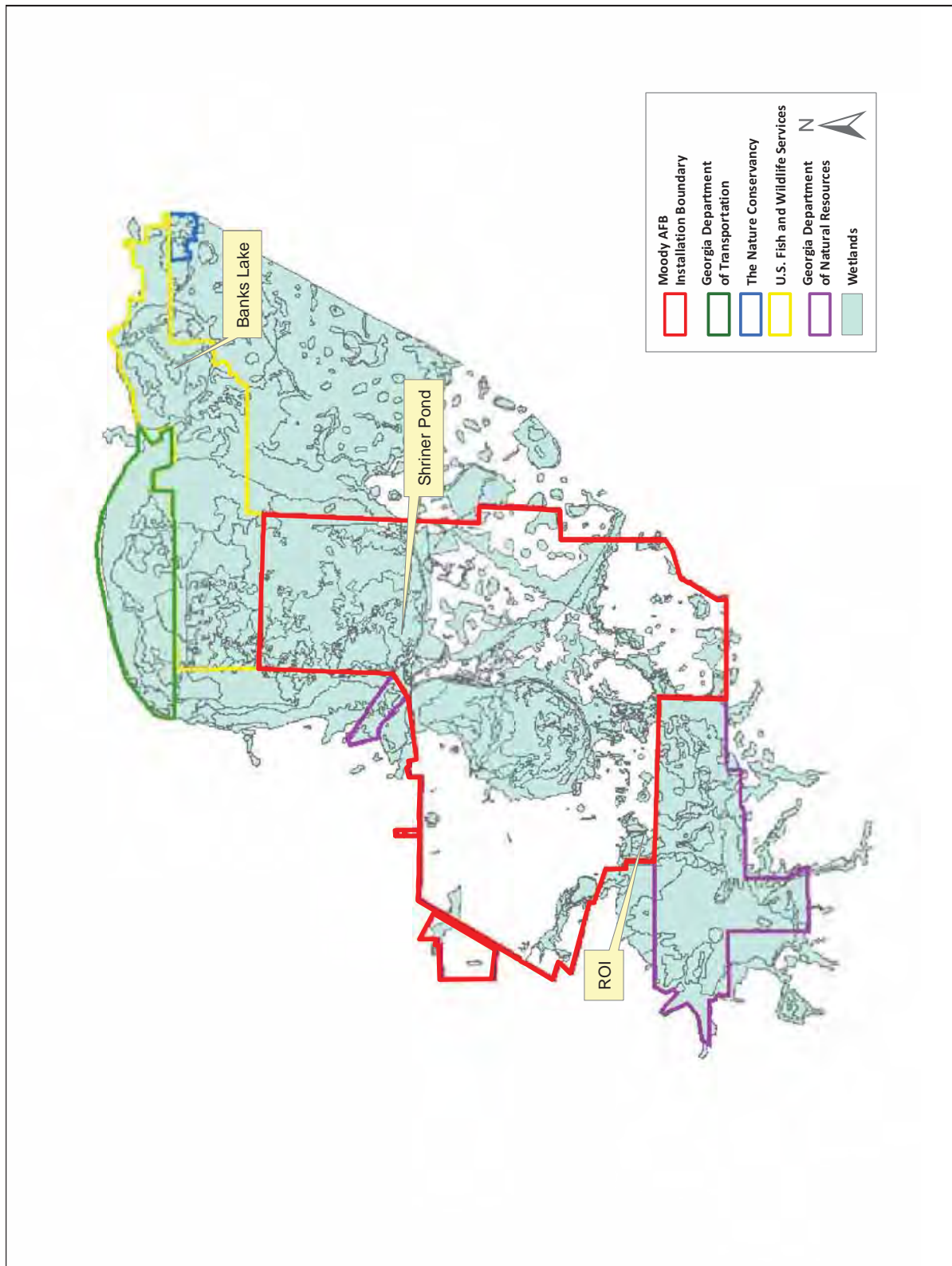
### 3.8.2 Description of the Affected Environment

The Grand Bay-Banks Lake wetland complex, which comprises more than 13,000 acres, is composed of several broad Carolina bays (1 to 4 miles across), which are collectively referred to as Grand Bay, and shallow lakes, interconnected by cypress-black gum swamp (MAFB 2007). Carolina bays are elliptical, shallow depressions found primarily on the coastal plains of the southeastern United States. They are characterized by being oriented on a northwest-southeast axis, and, in many cases, have a distinct sand rim on the southeastern end. Several different community types occur within the Carolina bay swamp complex, including open water, scrub-shrub, bay swamp, cypress domes, shallow ponds, and wetland depressions. Typically, these community types occur along a moisture gradient, with open water areas giving way to scrub-shrub habitat, which, in turn, is adjacent to bay swamps (MAFB 2008a).

The Grand Bay-Banks Lake wetland complex is owned and managed by several landowners, including Moody AFB, USFWS, Georgia DNR, Georgia Department of Transportation, The Nature Conservancy, and private landowners. Because it was recognized that this system should be managed as one large ecosystem, irrespective of land ownership, the major landowners within this complex created the Grand Bay-Banks Lake Council to provide for a coordinated effort in the management of the ecosystem (MAFB 2008a) (see **Figure 3-3**).

Field investigations performed in 2007 delineated 26 wetlands or wetland complexes on Moody AFB. Two wetland systems were identified on Moody AFB, based on the Cowardin Classification System (Cowardin et al. 1979), including palustrine and riverine. Based on the site investigations, there are 1,818.95 acres of jurisdictional wetlands on Moody AFB, including 1,674.35 acres of palustrine forested, 85.03 acres of palustrine emergent, 34.99 acres of palustrine open water, 0.40 acres of palustrine scrub-shrub/palustrine forested, 22.82 acres of palustrine emergent/palustrine scrub-shrub, 1.05 acres of palustrine open water/palustrine scrub-shrub, and 0.32 acres of riverine lower perennial habitats. **Table 3-12** provides the general location and the acreage of each of the wetlands delineated within the ROI. A description of each jurisdictional wetland within the ROI follows.

**Wetland-13 (WL-13).** Wetland-13 is a 23.15-acre wetland composed of 14.28 acres of palustrine forested and 8.87 acres of palustrine emergent habitat. The 8.87-acre palustrine emergent wetland is included in the ROI and the 14.28-acre palustrine forested wetland adjoins the ROI to the east. Wetland-



Source: Moody INRMP 2008

Figure 3-3. Grand Bay-Banks Lake Wetland Complex and Key Grand Bay-Banks Lake Council Landowners

**Table 3-12. General Location and Acreage of Each Wetland Delineated within the ROI**

ID	Location	Wetland Type	Total Acreage	Habitat Components (Acres)	
WL-13	Unit 1 – west of the munitions area and North Perimeter Road and north of Burma Road	Palustrine forested Palustrine emergent	23.15*	Forested	14.28
				Emergent*	8.87
WL-20	Unit 2 – south of Burma Road in the Clear Zone	Palustrine emergent Intermixed palustrine emergent/scrub-shrub	60.88	Emergent	43.53
				Emergent/ scrub-shrub	17.35
WL-21	Unit 2 – south of Burma Road and east of WL-20 in the Clear Zone	Palustrine emergent	20.26	--	
WL-22	Unit 2 – south of Burma Road in the Clear Zone	Palustrine emergent	0.64	--	

Source: MAFB 2007

Note: \* Only emergent component (8.87) included in the ROI

13 is west of the munitions area and North Perimeter Road. The palustrine emergent component of Wetland-13 extends into the Clear Zone of the airfield. Soil in the wetland is characterized by low chroma loamy sand, and the source of wetland hydrology appears to be from a seasonally high groundwater table and surface runoff. Wetland-13 drains into Wetland-21 through culverts that cross under Burma Road at the southern end of the wetland.

**Wetland-20 (WL-20).** Wetland-20 is a 60.88-acre wetland composed of 43.53 acres of palustrine emergent and 17.35 acres of intermixed palustrine emergent and scrub-shrub habitat. The wetland is in the Clear Zone south of Burma Road. Much of the northern, western, and southern wetland/upland boundary is characterized by fill from Burma Road, Crash Trail 1, and Crash Trail 2. Soil in the wetland is characterized by wet peat overlying low chroma wet sandy clay loam. The source of wetland hydrology appears to be from a high groundwater table and surface runoff.

**Wetland-21 (WL-21).** Wetland-21 is a 20.26-acre palustrine emergent wetland south of Burma Road and east of WL-20 in the Clear Zone. Most of the western boundary of Wetland-21 is characterized by fill associated with Crash Trail 2 and airfield-related development. Soil in the wetland is characterized by wet peat overlying low chroma wet heavy organic sandy loam. The source of wetland hydrology appears to be from a high groundwater table and surface runoff.

**Wetland-22 (WL-22).** Wetland-22 is a 0.64-acre palustrine emergent wetland south of Burma Road in the Clear Zone. Wetland-22 is situated on fill associated with the Clear Zone and landing approach lights. Soil in the wetland is characterized by gravelly fill. Wetland hydrology appears to result from runoff ponding on impervious fill material.

### 3.8.3 Environmental Consequences

#### Evaluation Criteria

Evaluation criteria for impacts on wetlands are based on the U.S. government's "no net loss" policy. A loss of a wetland includes degradation of size, functionality, quality, and connectivity of wetlands. A proposed action would have significant effects on wetlands if it were to do one or more of the following:



- Violate established laws or regulations adopted to protect wetlands
- Substantially adversely affect water quality (discussed in **Section 3.6**, Water Resources)
- Threaten or damage unique hydrologic characteristics
- Cause irreparable harm to wetland flora or fauna or beneficial uses of wetland ecosystems.

Adverse effects include any adverse ecological effect on wetlands or areas of open water. These effects include filling, excavating, flooding, draining, clearing, or similar changes affecting wetlands or open water areas. Direct impacts on wetlands would result from disturbances that occur within the wetland. Common direct impacts on wetlands include filling, grading, removal of vegetation, construction, and changes in water levels and drainage patterns. Most disturbances that result in direct impacts on wetlands are controlled by state and Federal wetland regulatory programs. Indirect impacts on wetlands result from disturbances that occur in areas outside of the wetland, such as uplands and other wetlands or waterways. Common indirect impacts include influx of surface water and sediments, fragmentation of a wetland from a contiguous wetland complex, loss of recharge area, or changes in local drainage patterns.

### **Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches**

Direct, short-term, minor, adverse effects and long-term, minor to moderate, adverse effects on wetlands would be expected from the implementation of Alternative 1 within the ROI. Short-term adverse effects on wetlands would occur from incidental damage of adjoining vegetation (e.g., trampling) during excavation activities from construction equipment. Impacts on vegetation outside of the ditches and French drain would be temporary as vegetation would be expected to grow back after construction activities have ceased.

Direct, long-term, minor to moderate, adverse effects on wetlands would be expected from Alternative 1. Alternative 1 would involve dredging to create the ditches within the south EOR wetlands and southeastern corner wetlands. Any dredging within the jurisdictional wetlands within the ROI would require Moody AFB to obtain a CWA Section 404 Standard Individual Permit from USACE Savannah District, as well as a CWA Section 401 Water Quality Certification from the State of Georgia. Significant adverse effects on wetlands would occur from the implementation of Alternative 1 within the ROI if these wetlands are not properly mitigated for. Alternative 1 would remove a minor to moderate amount of emergent vegetation, which would be replaced with open water and aquatic vegetation. Effects on vegetation are discussed in detail in **Section 3.9.3**.

Alternative 1 would change the local drainage pattern within the ROI, as water would be concentrated in ditches and moved offsite faster than current conditions. However, the overall drainage pattern from and to adjoining properties is anticipated to remain the same, as surface water would still be collected from adjoining wetlands to the west of the south EOR wetlands and would drain to adjoining wetlands to the east. Drainage from the southeastern corner wetlands under Burma Road to the south EOR wetlands would also remain unchanged. Therefore, long-term effects on wetlands due to changes in drainage patterns are expected to be negligible to minor. To minimize the impacts on wetlands and other waters of the United States caused by the parallel ditches, detailed hydrologic and hydraulic modeling should be performed to ensure the ditches do not dewater the remaining adjacent wetlands or change the hydrology of wetlands and receiving waters. If the ditch depth is designed correctly, there would be no change in surficial groundwater levels; therefore, soil moisture would not be affected and indirect impacts on wetlands from dewatering would not occur. The existing herbaceous community outside of the ditches would be expected to survive as long as the soil remains wet, which is anticipated.

Effects on water quality from Alternative 1 are discussed in **Section 3.6.2**, effects on soils from Alternative 1 are discussed in **Section 3.7.3**, and effects on wetland habitat from Alternative 1 are

discussed in **Section 3.9.3**. Potential mitigation requirements for implementing Alternative 1 are provided in **Appendix F**.

### **Alternative 2 – Complete Filling of Wetland Complex**

Direct, short-term, minor, adverse effects on wetlands would occur from incidental damage of adjoining vegetation (e.g., trampling) during filling activities from construction equipment. Impacts on vegetation adjoining the ROI would be temporary as vegetation would be expected to reestablish after construction activities have ceased.

Direct, long-term, major, adverse effects on wetlands would occur from the implementation of Alternative 2, which would involve the placement of fill into the entire south EOR and southeastern corner wetlands. Alternative 2 would completely and permanently convert approximately 90.65 acres of jurisdictional wetland to upland. Impacts would be major because the entire regulated wetland would be removed and replaced with upland. Any dredging or placement of fill within the jurisdictional wetlands within the south EOR or southeastern corner wetlands would require Moody AFB to obtain a CWA Section 404 Standard Individual Permit from USACE Savannah District, as well as a CWA Section 401 Water Quality Certification from the State of Georgia. Significant adverse effects on wetlands would occur from the implementation of Alternative 2 within the ROI if these wetlands are not properly mitigated for.

Approximately 120 acres of emergent and scrub-shrub vegetation would be permanently removed and replaced with Bahia grass, resulting in long-term, moderate to major adverse effects on wetlands. Additionally, Alternative 2 would change the local drainage pattern within the ROI, as water from adjoining wetlands would be diverted around the south EOR wetlands. However, the overall drainage pattern from and to adjoining properties is anticipated to remain the same, as surface water from adjoining wetlands to the west would drain to adjoining wetlands to the east. Therefore, long-term effects on wetlands due to changes in drainage patterns are expected to be negligible to minor. To minimize the impacts on adjoining wetlands and other waters of the United States caused by the filling wetlands in the ROI, detailed hydrologic and hydraulic modeling should be performed to ensure Alternative 2 does not change the hydrology of wetlands and receiving waters.

Indirect, long-term, moderate to major, adverse effects on wetlands would also be expected from Alternative 2. As discussed in **Section 3.6**, Water Resources, filling of the wetlands would remove the absorption ability provided by the wetlands, and the water volume conveyed to adjacent streams and wetlands would increase, resulting in long-term adverse effects on adjacent wetlands.

Effects on water quality from Alternative 2 are discussed in **Section 3.6.3**, effects on soils from Alternative 2 are discussed in **Section 3.7.3**, and effects on wetland habitat from Alternative 2 are discussed in **Section 3.9.3**. Potential mitigation requirements for implementing Alternative 2 are provided in **Appendix F**.

### **Alternative 3 – Dredging of Wetlands to Create Lake**

Direct, short-term, minor, adverse effects on wetlands would be expected from the implementation of Alternative 3 within the ROI. Short-term, minor adverse effects on wetlands would occur from incidental damage of adjoining vegetation (e.g., trampling) during filling activities from construction equipment. Impacts on vegetation adjoining the ROI would be temporary as vegetation would be expected to reestablish after construction activities have ceased.

Direct, long-term, moderate to major, adverse effects on wetlands would be expected from Alternative 3. Alternative 3 would involve the dredging and permanent removal of approximately 81.78 acres of

jurisdictional wetland to create a lake and the filling and permanent removal of approximately 8.87 acres of jurisdictional wetland. Long-term, moderate to major, adverse effects would be expected due to a complete and permanent loss of 90.65 acres of jurisdictional wetland; however, the placement of a lake within the south EOR wetlands would likely have less impacts than complete fill of the area as proposed under Alternative 2, as the lake would still provide storm water retention and a higher value habitat than Bahia grassland.

Any dredging or placement of fill within the jurisdictional wetlands within the south EOR or southeastern corner wetlands would require Moody AFB to obtain a CWA Section 404 Standard Individual Permit from USACE Savannah District, as well as a CWA Section 401 Water Quality Certification from the State of Georgia. Significant adverse effects on wetlands would occur from the implementation of Alternative 3 within the ROI if these wetlands are not properly mitigated for. Alternative 3 would remove a moderate to major amount of emergent and scrub-shrub vegetation, which would be replaced with open water and Bahia grass. Effects on vegetation are discussed in detail in **Section 3.9.3**.

Indirect, long-term, negligible to minor, adverse effects on wetlands would also be expected from Alternative 3. As discussed in **Section 3.6.3**, filling of the southeastern corner wetlands would remove the absorption ability provided by the wetlands, and the water volume conveyed to adjoining properties would increase, resulting in long-term adverse effects on adjacent wetlands.

Effects on water quality from Alternative 3 are discussed in **Section 3.6.3**, effects on soils from Alternative 3 are discussed in **Section 3.7.3**, and effects on wetland habitat from Alternative 3 are discussed in **Section 3.9.3**. Potential mitigation requirements for implementing Alternative 3 are provided in **Appendix F**.

#### **Alternative 4 – Partial Dredge and Fill**

Direct, short-term, minor, adverse effects and long-term, moderate to major, adverse effects on wetlands would be expected from the implementation of Alternative 4 within the ROI. Short-term, minor, adverse effects on wetlands would occur from incidental damage of adjoining vegetation (e.g., trampling) during filling activities from construction equipment. Impacts on vegetation adjoining the ROI would be temporary as vegetation would be expected to reestablish after construction activities have ceased.

Direct, long-term, moderate to major, adverse effects on wetlands would be expected from Alternative 4. Alternative 4 would involve the dredging of approximately 30 acres and fill of approximately 60 acres of jurisdictional wetland within the ROI. Long-term, moderate to major, adverse effects would be expected due to a complete and permanent loss of 90.65 acres of jurisdictional wetland; however, the placement of a 30-acre lake within the south EOR wetlands would likely have less impacts than complete fill of the area as proposed under Alternative 2, as the lake would still provide storm water retention and a higher value habitat than Bahia grassland.

Any dredging or placement of fill within the jurisdictional wetlands within the south EOR or southeastern corner wetlands would require Moody AFB to obtain a CWA Section 404 Standard Individual Permit from USACE Savannah District, as well as a CWA Section 401 Water Quality Certification from the State of Georgia. Significant adverse effects on wetlands would occur from the implementation of Alternative 4 within the ROI if these wetlands are not properly mitigated for. Alternative 4 would permanently remove a moderate to major amount of emergent and scrub-shrub vegetation, which would be replaced with open water and Bahia grass. Effects on vegetation are discussed in detail in **Section 3.9.3**.

Alternative 4 would change the local drainage pattern within the ROI, as water from adjoining wetlands would be diverted around a portion of the south EOR wetlands to the lake (see **Figure 2-3**). However, the overall drainage pattern from and to adjoining properties is anticipated to remain the same, as surface water from adjoining wetlands to the west would drain to adjoining wetlands to the east. Therefore, long-term effects on wetlands due to drainage changes are expected to be negligible to minor. To minimize the impacts on adjoining wetlands and other waters of the United States caused by filling wetlands in the ROI, detailed hydrologic and hydraulic modeling should be performed to ensure Alternative 4 does not change the hydrology of wetlands and receiving waters.

Indirect, long-term, moderate adverse effects on wetlands would also be expected from Alternative 4. Filling of approximately 60 acres of jurisdictional wetlands would remove the absorption ability provided by those wetlands, and the water volume conveyed to adjoining properties would increase, resulting in long-term, adverse effects on adjacent wetlands.

Effects on water quality from Alternative 4 are discussed in **Section 3.6.3**, effects on soils from Alternative 4 are discussed in **Section 3.7.3**, and effects on wetland habitat from Alternative 4 are discussed in **Section 3.9.3**. Potential mitigation requirements for implementing Alternative 4 are provided in **Appendix F**.

### **Alternative 5 – Increased Access and Vegetation Management**

Direct, short-term and long-term, minor, adverse effects on wetlands would be expected from the implementation of Alternative 5 within the ROI. Short-term, minor, adverse effects on wetlands would occur from incidental damage of adjoining vegetation (e.g., trampling) from construction equipment during vegetation removal and filling activities for the access road. Impacts on vegetation adjoining the ROI would be temporary as vegetation would be expected to grow back after construction activities have ceased.

Direct, long-term, negligible to minor adverse effects on wetlands would be expected from the implementation of Alternative 5. Alternative 5 would involve development of an access corridor within the wetland to allow access by an all-terrain vehicle with a trailer for the wildlife control specialist. Construction of the access road would likely require placement of fill within the south EOR wetlands, resulting in direct, long-term, minor adverse effects on wetlands. It is anticipated that the amount of fill would be minor; however, any dredging or placement of fill within jurisdictional wetlands would require Moody AFB to obtain a CWA Section 404 Standard Individual Permit from USACE Savannah District, as well as a CWA Section 401 Water Quality Certification from the State of Georgia. Significant adverse effects on wetlands would occur from the implementation of Alternative 5 within the ROI if these wetlands are not properly mitigated for.

Direct, long-term, negligible to minor, adverse effects on wetlands would be expected from the conversion of emergent vegetation to titi within the south EOR wetlands. Alternative 5 would permanently remove a moderate amount of emergent and scrub-shrub vegetation, which would be replaced with titi. Effects on vegetation are discussed in detail in **Section 3.9.3**.

Effects on water quality from Alternative 5 are discussed in **Section 3.6.3**, effects on soils from Alternative 5 are discussed in **Section 3.7.3**, and effects on wetland habitat from Alternative 5 are discussed in **Section 3.9.3**. Potential mitigation requirements for implementing Alternative 5 are provided in **Appendix F**.



## Alternative 6 – No Action Alternative

Under the No Action Alternative, the south EOR and southeastern corner wetlands would not receive additional intensive management. Conditions would remain as described in **Section 3.8.2**. No new effects on wetlands would be expected. Long-term, negligible to minor, adverse effects on wetlands would continue as a result of ongoing vegetation management within the ROI.

## 3.9 Biological Resources

### 3.9.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species, and designated or proposed critical habitat; species protected under other Federal laws (see **Appendix A**); species of concern managed under Conservation Agreements or Management Plans; and state-listed species.

Under the ESA (16 U.S.C. 1536), an “endangered species” is defined as any species in danger of extinction throughout all or a significant portion of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. The USFWS also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

### 3.9.2 Description of the Affected Environment

**Vegetation.** Moody AFB lies within the Outer Coastal Plain Forest province of the United States lowland ecoregion, as defined by (Bailey 1995). The Outer Coastal Plain Forest is dominated by temperate rainforest, also called temperate evergreen forest and laurel forest. Forests of the southeastern United States are dominated by pines (e.g., longleaf pine [*Pinus palustris*], loblolly pine [*P. taeda*], slash pine [*P. elliotii*]), oaks (*Quercus* spp.), and members of the laurel (Lauraceae) and magnolia (Magnoliaceae) families. Southeastern forests usually have a well-developed lower stratum of vegetation that includes tree ferns, small palms, shrubs, and herbaceous plants. Lianas and epiphytes (e.g., Spanish moss [*Tillandsia usneoides*]) are also abundant. Vast areas of gum-bay swamps and scrub-shrub wetlands exist throughout the area. Bald cypress (*Taxodium distichum*) and pond cypress (*T. ascendens*) are dominant trees in swamps and cypress domes throughout the region (MAFB 2008a).

Moody AFB contains a diversity of habitats, including upland pine forest, pine flatwoods, gum-bay-shrub swamps, upland hardwood hammocks, and freshwater ponds. Very few remnants of historic natural communities can be found on Moody AFB and in the greater Grand Bay-Banks Lake ecosystem due to land development, fire suppression, and conversion to other vegetative types (e.g., loblolly pine). Moody AFB is encompassed by an association of Carolina bay wetlands, which compose the Grand Bay-Banks Lake wetland complex (MAFB 2008a). Within the Carolina bay swamp complex, there are small areas of open water, usually with a scattered tree overstory. Open water areas contain typical aquatic plants, including fragrant water lily (*Nymphaea odorata*), water shield (*Brasenia schreberi*), and fanwort (*Cabomba caroliniana*) (MAFB 2008a). The scrub-shrub community exists as a transition area between the open water areas and the drier bay swamps. Scrub-shrub areas are nonforested areas dominated by woody shrubs, seedlings, and saplings averaging less than 20 feet in height. Forested wetlands in the region are dominated by black gum- (*Nyssa sylvatica*) cypress forests, with significant amounts of red maples (*Acer rubrum*), tupelos (*Nyssa* spp.), sweetgums (*Liquidambar styraciflua*), sweetbays (*Magnolia virginiana*), and other wetland trees (MAFB 2008a).

The south EOR wetlands and southeastern corner wetlands are periodically treated with herbicide applications to control tree growth for aircraft safety during approach to and departures from the runways. The south EOR wetlands contain intermixed palustrine emergent and scrub-shrub habitat; and the southeastern corner wetlands contain palustrine emergent habitat. Emergent plant species in the ROI include combleaf mermaid weed (*Proserpinaca pectinata*), mermaid weed (*P. palustris*), blue verbenia (*Verbena hastata*), spatterdock (*Nuphar lutea*), lizard tail (*Saururus cernuus*), path rush (*Juncus tenuis*), red pod rush (*Juncus trigonocarpus*), soft rush (*Juncus effusus*), spike rush (*Rhynchospora* sp.), woolgrass (*Scirpus cyperinus*), dark green bulrush (*Scirpus atrovirens*), seedbox (*Ludwigia alternifolia*), blunt leaf bedstraw (*Galium obtusum*), purple sesban (*Sesbania punicea*), arrow arum (*Peltandra virginica*), narrow leaved cattail (*Typha angustifolia*), orange milkwort (*Polygala lutea*), and narrow leaved pickerelweed (*Pontederia cordata* var. *lanceifolium*). The intermixed palustrine emergent and scrub-shrub habitat in the southern section of the south EOR wetlands has vegetation similar to the emergent habitat, but includes common pond cypress saplings and more abundant spatterdock (MAFB 2007).

**Wildlife.** Open water areas are important habitat types for fish species, including warmouth (*Lepomis gulosus*), red-breasted sunfish (*L. microlophus*), redbfin pickerel (*Esox americanus*), lake chain pickerel (*Esox niger*), yellow bullhead (*Ameiurus natalis*), madtom (*Noturus* spp.), and largemouth bass (*Micropterus salmoides*). Mammal and bird species typically associated with these areas include raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), round-tailed muskrat (*Neofiber alleni*), prothonotary warbler (*Protonotaria citrea*), hooded warbler (*Wilsonia citrine*), common yellowthroat (*Geothlypis trichas*), herons, and egrets. Additionally, southern bullfrog (*Rana catesbeiana*), pig frog (*Rana grylio*), American alligator (*Alligator mississippiensis*), snapping turtle (*Chelydra serpentina*), eastern cottonmouth (*Agkistrodon piscivorus*), southern water snake (*Nerodia rhombifer*), and other water-dependent reptiles and amphibians can be found in these areas (MAFB 2008a).

In scrub-shrub habitats, mammalian wildlife species such as white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), raccoon, bobcat (*Felis rufus*), opossum, golden mouse (*Ochrotomys nuttalli*), and other small mammals can be found. Bird species associated with this area include eastern towhee (*Pipilo erythrophthalmus*), white-eyed vireo (*Vireo griseus*), gray catbird (*Dumetella carolinensis*), northern cardinal (*Cardinal cardinalis*), indigo bunting (*Passerina cyanea*), hooded warbler, Swainson's warbler (*Limnithlypis swainsonii*), and other similar shrub-dwelling birds. Reptiles and amphibians that utilize this area are similar to both the open water and the bay swamp community types (MAFB 2008a).

Bay swamps, along the margins of the Carolina bays, are dominated by black gum-cypress forests. Mammals associated with this habitat type include the opossum, raccoon, gray fox (*Urocyon cinereoargenteus*), gray squirrel (*Sciurus carolinensis*), eastern cottontail, and white-tailed deer. Common birds include the red-shouldered hawk (*Buteo lineatus*); woodpeckers (downy [*Picoides pubescens*]; red-bellied [*Melanerpes carolinus*]; pileated [*Dryocopus pileatus*]); yellowbellied sapsucker [*Sphyrapicus varius*]; northern flicker [*Colaptes auratus*]; great-crested flycatcher (*Myiarchus crinitus*); blue jay (*Cyanocitta cristata*); Carolina chickadee (*Parus carolinensis*); tufted titmouse (*Parus bicolor*); Carolina wren (*Certhia americana*); blue-gray gnatcatcher (*Polioptila caerulea*); ruby-crowned kinglet (*Regulus calendula*); brown thrasher (*Toxostoma rufum*); gray catbird, white-eyed vireo, and red-eyed vireo (*Vireo olivaceus*); northern parula (*Parula americana*); common grackle (*Quiscalus quiscula*); northern cardinal, hooded warblers; and prothonotary warblers. Common reptiles and amphibians include the rainbow snake (*Farancia erythrogramma erythrogramma*), eastern box turtle (*Terrapene carolina carolina*), spotted salamander (*Ambystoma maculatum*), green tree frog (*Hyla cinerea*), southern toad (*Bufo terrestris*), eastern cottonmouth, and southern water snake (MAFB 2008a).

The Grand Bay-Banks Lake wetland complex hosts Georgia's largest wintering population of sandhill cranes, totaling approximately 2,000 birds. The state-owned property including Grand Bay proper is the focal point for this wintering population. Grand Bay also supports nocturnal winter roosts of approximately 2,000 white ibis and 500 black vultures and turkey vultures. In spring and summer, thousands of anhingas (*Anhinga anhinga*), egrets, herons, and white ibis nest in a dense rookery at the center of the bay. In addition, Grand Bay supports a population of at least 700 nesting pairs of wood duck. Grand Bay and adjoining marshes are important wintering habitat for American bittern and post-breeding staging habitat for wood storks (NAS 2009).

**Protected and Sensitive Species.** Eight federally or state-listed rare, threatened, or endangered species have been documented on Moody AFB (see **Table 3-13**). Of these eight species, three are federally listed as either threatened or endangered, including the wood stork (endangered), eastern indigo snake (*Drymarchon couperi*) (threatened), and American alligator (*Crocodylus acutus*) (threatened due to similarity of appearance to American crocodile). Four other species are state-listed as threatened, including the round-tailed muskrat (*Neofiber alleni*), southern bald eagle (*Haliaeetus leucocephalus leucocephalus*), alligator snapping turtle (*Macrochelys temminckii*), and gopher tortoise (*Gopherus polyphemus*). The gopher tortoise is also a candidate for Federal listing. The Bachman's sparrow (*Aimophila aestivalis*) is state-listed as rare. The eastern indigo snake, gopher tortoise, and bald eagle are the only threatened and endangered species that are actively managed as these species are most likely to be affected by the military mission. There is no critical habitat as defined by the ESA on the installation (MAFB 2008a).

According to the 2007–2012 INRMP for Moody AFB, the ROI contains potential habitat for the eastern indigo snake, gopher tortoise, and the bald eagle. Potential habitat for the eastern indigo snake and gopher tortoise primarily occurs along the edges of the south EOR wetlands in the higher elevation, nonwetland areas (MAFB 2008a). The burrows created by the gopher tortoise serve as habitat for more than 200 other animals, including the federally threatened eastern indigo snake. If tortoise burrows are destroyed, many species could also be affected. While the gopher tortoise is not currently federally listed under the ESA, any installation activity that occurs in or near gopher tortoise habitat is coordinated with the USFWS because of the close association between gopher tortoises and the eastern indigo snake (MAFB 2008a). American alligators, federally threatened due to similarity of appearance to the American crocodile, are commonly found on Moody AFB and have been observed within the ROI. Wood storks are occasionally observed within the ROI during the breeding season foraging in the wetlands when habitat conditions are suitable. Wood storks do not nest or roost on Moody AFB (MAFB 2008a).

According to Moody AFB's INRMP, only one known eagle nest exists on Moody AFB, which is at the Grassy Pond Recreational Annex, approximately 25 miles southwest of the main installation. No construction, timber harvesting, or other significant disturbances are allowed in areas near this nest, and when construction activities are proposed for the Grassy Pond Recreational Annex, the USFWS and Georgia DNR are consulted to ensure compliance with the *Bald and Golden Eagle Protection Act* and state regulations (MAFB 2008a). The *Bald and Golden Eagle Protection Act* prohibits the "take" of bald or golden eagles in the United States. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." For purposes of these guidelines, "disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle; 2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a

**Table 3-13. Federal and State Rare, Threatened, and Endangered Species Identified on Moody AFB**

Common Name	Scientific Name	Federal Status	State Status	Habitat
<b>Birds</b>				
Bachman's sparrow	<i>Aimophila aestivalis</i>	None	R	Open pine or oak woods; old fields; brushy areas
Bald eagle	<i>Haliaeetus leucocephalus</i>	None	T	Edges of lakes and large rivers; seacoasts
Wood stork	<i>Mycteria americana</i>	E	E	Cypress/gum ponds; marshes; river swamps; bays
<b>Mammals</b>				
Round-tailed muskrat	<i>Neofiber alleni</i>	None	T	Freshwater marshes; bogs
<b>Reptiles</b>				
Alligator snapping turtle	<i>Macrochelys temminckii</i>	None	T	Large streams and rivers; impoundments; river swamps
American alligator	<i>Alligator mississippiensis</i>	T (S/A)	None	Fresh and brackish marshes, ponds, lakes, rivers, swamps
Eastern indigo snake	<i>Drymarchon couperi</i>	T	T	Sandhills; pine flatwoods; dry hammocks; summer habitat includes floodplains and bottomlands
Gopher tortoise	<i>Gopherus polyphemus</i>	None	T	Sandhills; dry hammocks; longleaf pine-turkey oak woods; old fields

Sources: MAFB 2008a, MAFB 2005, Georgia DNR 2008b

Notes:

R = Rare

E = Endangered

T = Threatened

S/A = Similarity of Appearance

previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits; and causes injury, death or nest abandonment (USFWS undated).

When proposed actions occur in habitat for listed species, Moody AFB coordinates with the USFWS as required by Section 7 of the ESA. The majority of previous consultations at Moody AFB involved proposed military training and construction or demolition activities and their potential impact on gopher tortoise and eastern indigo snake habitat. Moody AFB has been involved in two formal consultations that resulted in biological opinions and incidental take statements (in 1996 and 1999), both unrelated to the ROI (MAFB 2008a).



### 3.9.3 Environmental Consequences

#### Evaluation Criteria

The significance of effects on biological resources is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to proposed activities, and (4) the duration of ecological effects. A habitat perspective is used to provide a framework for analysis of general classes of effects (e.g., noise, human disturbance).

The ESA protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. The ESA requires that all Federal agencies avoid “taking” threatened or endangered species, which includes jeopardizing threatened or endangered species critical habitat. Adverse effects can be direct, such as the physical disruption or contamination, or indirect, such as loss of prey or reduction in fecundity. Federal agencies are required to conduct correspondence with the USFWS to ensure that agency actions would not adversely affect the existence of any federally threatened or endangered species. If it is determined that the potential to affect threatened or endangered species exists, then consultation with USFWS would be required. The ESA also requires the preparation of a biological assessment when such species are present in an area that is affected by government activities.

#### Alternative 1 – Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches

**Vegetation.** Excavation of the ditches within the ROI would have direct, long-term, minor, adverse effects on emergent and scrub-shrub vegetation due to direct removal of the vegetation within the areas proposed for ditch excavation. Direct, short-term, minor adverse effects would also be expected due to incidental damage of adjoining vegetation from excavation of the ditches and French drain and trampling from construction equipment.

If the ditch depth is designed correctly, there would be no change in surficial groundwater levels; therefore, soil moisture would not be affected. The existing herbaceous community outside of the ditches would be expected to survive as long as the soil remains wet, which is anticipated.

Indirect, long-term, minor, adverse effects on vegetation could also be expected due to an increased potential of invasive plant establishment in the ROI. Disturbance to soil and vegetation from land clearing and excavation could enhance conditions for the establishment and spread of nonnative plant species. However, under EO 13112, *Invasive Species*, Moody AFB would be required to prevent the introduction of invasive species and detect and control populations of such species.

Long-term, minor, beneficial effects on vegetation would be expected from planting native floating-leaved aquatic vegetation, such as spatterdock or fragrant water lily within the ditches, which would result in increased vegetation species diversity in the ROI.

**Wildlife.** Direct, short-term, minor to moderate, adverse effects on wildlife during excavation and construction of wetland ditches and the French drain would be expected. Auditory, visual, and physical disturbances during construction would be expected to disrupt several wildlife species. During the implementation of Alternative 1, there would be short-term increases in ambient noise levels from construction activities including clearing, grading, and excavation; and noise associated with construction equipment (e.g., backhoes and dump trucks) moving to and from the project site. Certain wildlife species adapted to noise and other disturbance levels associated with common activities on Moody AFB (e.g.,

training activities including the use of blank ammunition, pyrotechnics, aircraft, military vehicles, and all-terrain vehicles) would be expected to return to the area after construction activities cease.

Alternative 1 would result in direct, long-term, minor, adverse effects on wildlife due to a permanent change in habitat. Habitat specialists within the ROI might be forced to relocate to adjacent habitats. Long-term impacts would be less for habitat generalists in the ROI. Indirect, short-term and long-term, negligible to minor, adverse effects on wildlife within adjoining habitats would also be expected, as Alternative 1 would likely displace certain animals into other individuals' territories, thereby increasing energy costs of those individuals that must defend their existing territories.

Direct, long-term, minor, adverse effects on smaller, less-mobile species within the ROI could also occur as a result of direct mortality associated with collision with construction equipment. BMPs, such as stopping construction activities when wildlife is encountered, would be implemented to allow less-mobile species to avoid impacts from construction equipment. Additional BMPs, such as providing educational materials and briefing construction personnel on the potential species that might be encountered, could be implemented.

Long-term, minor, adverse effects on wading birds would be expected from Alternative 1. A reduction in surface water in the ROI would be expected to decrease the amount of foraging habitat for wading birds in the ROI. Planting the ditches with floating-leaved aquatic vegetation would likely reduce foraging habitat for those wading birds that visually stalk prey (e.g., great blue heron, great and snowy egrets), as the vegetation would conceal prey. Additionally, maintenance of the ditches and banks to prevent the establishment of emergent vegetation would also reduce preferred habitat for most wading bird species.

Long-term, negligible to minor, beneficial effects on wildlife would be expected from the establishment of ditches within the ROI. The ditches would create a somewhat permanent source of open water within the ROI. The lack of vegetation along the banks of the ditches could potentially attract different species of birds that prefer foraging on exposed mud, such as sandpipers (MAFB 2003b). In addition, the establishment of floating-leaved aquatic vegetation within the ditches would likely provide new habitat for several species, such as frogs and fish.

***Protected and Sensitive Species.*** According to the INRMP, eight rare, threatened, and endangered species occur on Moody AFB (MAFB 2008a). The ROI contains potential habitat for the bald eagle, state-listed as threatened; wood stork, federally and state-listed as endangered; eastern indigo snake, federally and state-listed as threatened; American alligator, federally listed as threatened due to similarity of appearance to the American crocodile (*Crocodylus acutus*); and gopher tortoise, state-listed as threatened; therefore, a potential exists to encounter these species during implementation of Alternative 1. Wood storks have been observed foraging within the ROI (Lee 2009). In addition, American alligators are commonly found on Moody AFB and have been observed within the ROI. Potential burrow habitat for the eastern indigo snake and gopher tortoise occurs along the edges of the south EOR wetlands in the upland areas (MAFB 2008a). Even though these areas would not likely be directly affected by Alternative 1, indirect adverse effects could be expected from incidental damage of adjoining habitat from excavation activities and trampling from construction equipment.

If a Federal- or state-listed threatened or endangered species is encountered during construction within the ROI, all construction activities would cease and the USFWS or Georgia DNR would be notified for instruction on appropriate procedures to follow to ensure that the species were not adversely impacted.

Several migratory birds would be expected to utilize the ROI for nesting purposes. The *Migratory Bird Treaty Act of 1918* (16 U.S.C. 703–712) as amended, and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, require Federal agencies to minimize or avoid impacts on migratory birds

listed in 50 CFR 10.13. Removal of vegetation and excavation of ditches should be conducted during the nonbreeding season. Otherwise, Alternative 1 could potentially result in a “take” of migratory birds’ nests and eggs, which is prohibited under the *Migratory Bird Treaty Act* and would result in significant impacts on migratory birds. If design and implementation of a Federal action cannot avoid measurable negative impact on migratory birds, EO 13186 requires the responsible agency to consult with the USFWS and obtain a Migratory Bird Depredation Permit. The following BMPs are recommended for reduction or avoidance of impacts on migratory birds:

- Any groundbreaking construction activities should be performed before migratory birds return to the site (approximately March 15) or after all young have fledged (approximately July 31) to avoid incidental take.
- If construction is scheduled to start during the period in which migratory bird species are present, steps should be taken to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and structures and use of various excluders (e.g., noise). Birds can be harassed to *prevent* them from nesting on the site. Once a nest is established, they cannot be harassed until all young have fledged and are capable of leaving the nest site.
- If construction is scheduled to start during the period when migratory birds are present, a site-specific survey for nesting migratory birds should be performed starting at least 2 weeks prior to site clearing.
- If nesting birds are found during the survey, buffer areas should be established around nests. Construction should be deferred in buffer areas until birds have left the nest. Confirmation that all young have fledged should be made by a qualified biologist.

The *Bald and Golden Eagle Protection Act* could apply to the implementation of Alternative 1 within the ROI if it is determined that a bald eagle or bald eagle nest could be affected. Currently, there are no known eagle nests within the ROI. If a bald eagle nest is discovered in or near the ROI, the USFWS and Georgia DNR would be consulted to ensure compliance with the *Bald and Golden Eagle Protection Act* and state regulations; therefore, the implementation of Alternative 1 is not expected to have adverse effects on bald eagles.

## Alternative 2 – Complete Filling of Wetland Complex

**Vegetation.** Direct, long-term, moderate to major, adverse effects on vegetation would be expected from the implementation of Alternative 2 within the ROI. All emergent and scrub-shrub vegetation within the south EOR wetlands and southeastern corner wetlands would be removed and replaced with Bahia grass, resulting in a complete and permanent change from a wetland to grassland. The planting of Bahia grass, which is a nonnative species, would decrease native vegetation cover and vegetation species diversity. Additional direct, negligible to minor, adverse effects would be expected due to incidental damage of adjoining vegetation from excavation activities and trampling from construction equipment.

Indirect, long-term, minor adverse effects on vegetation could also be expected due to an increased potential of invasive plant establishment in the south EOR wetlands. The filled area would be planted with Bahia grass, a nonnative species. Under EO 13112, *Invasive Species*, Moody AFB would be required to control the population of this species so it does not spread to adjoining natural areas.

**Wildlife.** Alternative 2 proposes a complete change in habitat within the ROI from palustrine emergent wetland to Bahia grassland. Direct, short-term, moderate to major, adverse effects on wildlife would be expected due to construction disturbances as described in Alternative 1. Disturbances from Alternative 2

would be expected to be greater than Alternative 1, as more intensive disturbances would be expected over a much greater period of time from the complete filling of the south EOR and southeastern corner wetlands.

Direct, long-term, moderate to major, adverse effects on wildlife would be expected from the complete and permanent loss of approximately 120 acres of wetland habitat, which would be replaced with Bahia grassland, a much lower value habitat for wildlife. Wildlife species diversity in the ROI would also be expected to greatly decrease, resulting in long-term, minor to moderate, adverse effects. Alternative 2 would shift the existing water-dependant wildlife community to a meadow community, which is expected to be much lower in diversity due to a much less diverse habitat provided by Bahia grass. Most species currently within the ROI would be expected to permanently relocate to adjoining habitats. Species with larger territories would be particularly impacted, as they might not be able to relocate to adjoining areas. Indirect, short-term and long-term, negligible to minor, adverse effects on wildlife within adjoining habitats would also be expected, as Alternative 2 would displace wildlife into other individuals' territories, thereby increasing energy costs of those individuals that must defend their existing territories.

Direct, long-term, moderate, adverse effects on smaller, less-mobile species within the south EOR wetlands could also occur as a result of direct mortality associated with collision with construction equipment. BMPs, such as stopping construction activities when wildlife is encountered, would be implemented to allow less-mobile species to avoid impacts from construction equipment. Additional BMPs include providing educational materials and briefing construction personnel on the potential species that might be encountered.

**Protected and Sensitive Species.** According to the INRMP, eight rare, threatened, and endangered species occur on Moody AFB (MAFB 2008a). The ROI contains potential habitat for the bald eagle, state-listed as threatened; wood stork, federally and state-listed as endangered; eastern indigo snake, federally and state-listed as threatened; American alligator, federally listed as threatened due to similarity of appearance to the American crocodile; and gopher tortoise, state-listed as threatened; therefore, a potential exists to encounter these species during implementation of Alternative 2. Wood storks have been observed foraging within the ROI (Lee 2009). In addition, American alligators are commonly found on Moody AFB and have been observed within the ROI. Potential burrow habitat for the eastern indigo snake and gopher tortoise occurs along the edges of the south EOR wetlands in the upland areas (MAFB 2008a). Even though these areas would not likely be directly affected by Alternative 2, indirect adverse effects could be expected from incidental damage of adjoining habitat from excavation activities and trampling from construction equipment.

If a Federal- or state-listed threatened or endangered species is encountered during construction within the ROI, all construction activities would cease and the USFWS or Georgia DNR would be notified for instruction on appropriate procedures to follow to ensure that the species were not adversely impacted.

Filling activities within the ROI should be conducted during the nonbreeding season. Otherwise, Alternative 2 could potentially result in a "take" of migratory birds' nests and eggs, which is prohibited under the *Migratory Bird Treaty Act* and would result in significant impacts on migratory birds. BMPs related to migratory bird species during construction discussed under Alternative 1 would also be implemented for Alternative 2.

### **Alternative 3 – Dredging of Wetlands to Create Lake**

**Vegetation.** Direct, long-term, moderate to major, adverse effects on vegetation would be expected from the implementation of Alternative 3 within the ROI. Emergent and scrub-shrub vegetation within the south EOR wetlands would be permanently removed and replaced with open water; and emergent



vegetation in the southeastern corner wetlands would be permanently removed and replaced with Bahia grass. Furthermore, vegetation would not be allowed to reestablish along the banks of the lake, resulting in a complete loss of emergent vegetation within the lake footprint. However, long-term, negligible to minor, beneficial impacts would be expected from the creation of a lake if submerged aquatic vegetation establishes or if floating-leaved aquatic vegetation is allowed to grow within the lake. Additional direct, short-term, negligible to minor, adverse effects would be expected due to incidental damage of adjoining vegetation from excavation activities and trampling from construction equipment.

Indirect, long-term, minor, adverse effects on vegetation could also be expected due to an increased potential of invasive plant establishment in the south EOR wetlands. Disturbance to soil and vegetation from land clearing and excavation could enhance conditions for the establishment and spread of nonnative plant species. However, under EO 13112, *Invasive Species*, Moody AFB would be required to prevent the introduction of invasive species and detect and control populations of such species.

**Wildlife.** Short-term and long-term, minor to moderate, adverse effects on wildlife would be expected as a result of the implementation of Alternative 3 within the ROI. Direct, short-term, minor to moderate, adverse effects on wildlife would be expected due to construction disturbances as described in Alternative 1. Disturbances from Alternative 3 would be expected to be greater than Alternative 1, as more intensive disturbances would be expected over a much greater period of time from the flooding of the entire south EOR wetlands and complete filling of the southeastern corner wetlands.

The long-term effects of Alternative 3 would be species-specific, as the removal of wetlands would adversely affect wetland-associated species due to the permanent removal of wetland habitat, but would be beneficial for open water wildlife species, due to the creation of new open water habitat. Therefore, Alternative 3 would be expected to have long-term adverse and beneficial effects on wildlife. Most species currently within the south EOR wetlands would be expected to permanently relocate to adjoining habitats. Species with larger territories would be particularly impacted, as they might not be able to relocate to adjoining areas. Indirect, short-term and long-term, negligible to minor, adverse effects on wildlife within adjoining habitats would also be expected, as Alternative 3 would displace wildlife into other individuals' territories, thereby increasing energy costs of those individuals that must defend their existing territories.

Long-term, minor, beneficial effects on wildlife would be expected from the creation of a lake in the ROI. Waterfowl and other open water-associated birds, aquatic species (e.g., frogs, newts, fish, turtles, snakes), and several species of mammals would be expected to benefit from the new habitat provided by the lake. However, the new lake habitat might actually create an ecological trap for many wildlife species due to ongoing BASH management activities. An ecological trap is a scenario in which a habitat still retains certain cues that species use to select habitat (e.g., open water in the lake), but that ultimately negatively affects that species' fitness or survivability (e.g., decreased fitness from BASH harassment or direct mortality from permitted depredation) (Shochat et al. 2005). Several new species might be attracted to the new lake habitat, but would be adversely affected from ongoing BASH management activities, such as pyrotechnics and permitted lethal shooting. Therefore, Alternative 3 could ultimately adversely affect new wildlife species and individuals attracted to the lake due to decreased fitness, reproductive success, or survivorship from ongoing BASH management on the installation.

Direct, long-term, minor to moderate, adverse effects on smaller, less-mobile species within the ROI could also occur as a result of direct mortality associated with collision with construction equipment or drowning from flooding the area. BMPs, such as stopping construction activities when wildlife is encountered, would be implemented to allow less-mobile species to avoid impacts from construction equipment. Additional BMPs include providing educational materials and briefing construction personnel on the potential species that might be encountered.

**Protected and Sensitive Species.** According to the INRMP, eight rare, threatened, and endangered species occur on Moody AFB (MAFB 2008a). The ROI contains potential habitat for the bald eagle, state-listed as threatened; wood stork, federally and state-listed as endangered; eastern indigo snake, federally and state-listed as threatened; American alligator, federally listed as threatened due to similarity of appearance to the American crocodile; and gopher tortoise, state-listed as threatened; therefore, a potential exists to encounter these species during implementation of Alternative 3. Wood storks have been observed foraging in the ROI (Lee 2009). In addition, American alligators are commonly found on Moody AFB and have been observed within the ROI. Potential burrow habitat for the eastern indigo snake and gopher tortoise occurs along the edges of the south EOR wetlands in the upland areas (MAFB 2008a). Even though these areas would not likely be directly affected by Alternative 3, indirect adverse effects could be expected from incidental damage of adjoining habitat from excavation activities and trampling from construction equipment.

If a Federal- or state-listed threatened or endangered species is encountered during construction within the ROI, all construction activities would cease and the USFWS or Georgia DNR would be notified for instruction on appropriate procedures to follow to ensure that the species were not adversely impacted.

As discussed in the effects of Alternative 3 on wildlife, the newly created lake in the ROI could actually serve as an ecological trap for wildlife, including sensitive and protected species, due to ongoing BASH management techniques. The lake could particularly attract bald eagles (state-listed as threatened), American alligators (federally listed as threatened due to similarity of appearance to American crocodile), and alligator snapping turtles (state-listed as threatened). Attracting the bald eagle is of particular concern as it is protected by the *Bald and Golden Eagle Protection Act*, which prohibits disturbances that could decrease eagles' productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or that causes nest abandonment. Continuous monitoring for bald eagles would be necessary if Alternative 3 is implemented to ensure individuals do not nest within or near the ROI.

The new lake in the ROI would be expected to attract several species of migratory waterfowl and other water birds, either as permanent habitat or stopover habitat during migrations. This would likely result in direct, long-term, minor, beneficial effects on migratory birds due to creation of new habitat; and direct, long-term, minor, adverse effects on migratory birds from the creation of a potential ecological trap due to ongoing BASH management.

Dredging activities within the ROI should be conducted during the nonbreeding season. Otherwise, Alternative 3 could potentially result in a "take" of migratory birds' nests and eggs, which is prohibited under the *Migratory Bird Treaty Act* and would result in significant impacts on migratory birds. BMPs related to migratory bird species during construction discussed under Alternative 1 would also be implemented for Alternative 3.

#### **Alternative 4 – Partial Dredge and Fill**

**Vegetation.** Direct, long-term, moderate to major adverse effects on vegetation would be expected from the implementation of Alternative 4 within the ROI. Emergent and scrub-shrub vegetation within the ROI would be completely and permanently removed and replaced with Bahia grassland and a 30-acre lake. The planting of Bahia grass, which is a nonnative species, would decrease native vegetation cover and vegetation species diversity. Furthermore, vegetation would not be allowed to reestablish along the banks of the lake, resulting in a complete loss of emergent vegetation within the lake footprint. Additional direct adverse effects would be expected due to incidental damage of adjoining vegetation from excavation activities and trampling from construction equipment.

Indirect, long-term, minor, adverse effects on vegetation could also be expected due to an increased potential of invasive plant establishment in the ROI. Disturbance to soil and vegetation from land clearing and excavation could enhance conditions for the establishment and spread of nonnative plant species. However, under EO 13112, *Invasive Species*, Moody AFB would be required to prevent the introduction of invasive species and detect and control populations of such species.

Long-term, minor, beneficial effects would be expected from the creation of a lake if submerged aquatic vegetation establishes or if floating-leaved aquatic vegetation is allowed to grow within the lake, due to increased vegetation species diversity in the area.

**Wildlife.** Short-term and long-term, minor to moderate, adverse effects on wildlife would be expected as a result of the implementation of Alternative 4 within the ROI. Direct, short-term, minor to moderate, adverse effects on wildlife would be expected due to construction disturbances as described in Alternative 1. Disturbances from Alternative 4 would be expected to be greater than Alternative 1, as more intensive disturbances would be expected over a much greater period of time from the excavation of a 30-acre lake in the south EOR wetlands and complete filling of the remaining wetlands in the ROI.

The long-term effects of Alternative 4 would be species-specific, as the removal of wetlands would adversely affect wetland-associated species due to the permanent removal of wetland habitat, but would be beneficial for open water wildlife species due to the creation of new open water habitat. Therefore, Alternative 4 would be expected to have long-term adverse and beneficial effects on wildlife. Most species currently within the ROI would be expected to permanently relocate to adjoining habitats. Species with larger territories would be particularly affected, as they might not be able to relocate to adjoining areas. Indirect, short-term and long-term, negligible to minor, adverse effects on wildlife within adjoining habitats would also be expected, as Alternative 4 would displace wildlife into existing territories, thereby increasing energy costs of individuals to defend their existing territories.

Long-term, minor, beneficial effects on wildlife would be expected from the creation of a lake in the ROI. Waterfowl and other open water-associated birds, aquatic species (e.g., frogs, newts, fish, turtles, snakes), and several species of mammals would be expected to benefit from the new habitat provided by the lake. However, the new lake habitat might actually create an ecological trap for many wildlife species due to ongoing BASH management activities, as discussed in Alternative 3. Several new species might be attracted to the new lake habitat, but would be adversely affected from ongoing BASH management activities, such as pyrotechnics and permitted lethal shooting. Therefore, Alternative 4 could ultimately adversely affect new wildlife species and individuals attracted to the lake due to decreased fitness, reproductive success, or survivorship from ongoing BASH management on the installation.

Direct, long-term, minor to moderate, adverse effects on smaller, less-mobile species within the ROI could also occur as a result of direct mortality associated with collision with construction equipment or drowning from flooding approximately 30 acres. BMPs, such as stopping construction activities when wildlife is encountered, would be implemented to allow less-mobile species to avoid impacts from construction equipment. Additional BMPs include providing educational materials and briefing construction personnel on the potential species that might be encountered.

**Protected and Sensitive Species.** According to the INRMP, eight rare, threatened, and endangered species occur on Moody AFB (MAFB 2008a). The ROI contains potential habitat for the bald eagle, state-listed as threatened; wood stork, federally and state-listed as endangered; eastern indigo snake, federally and state-listed as threatened; American alligator, federally listed as threatened due to similarity of appearance to the American crocodile; and gopher tortoise, state-listed as threatened; therefore, a potential exists to encounter these species during implementation of Alternative 4. Wood storks have been observed foraging in the ROI (Lee 2009). In addition, American alligators are commonly found on

Moody AFB and have been observed within the ROI. Potential burrow habitat for the eastern indigo snake and gopher tortoise occurs along the edges of the south EOR wetlands in the upland areas (MAFB 2008a). Even though these areas would not likely be directly affected by Alternative 4, indirect adverse effects could be expected from incidental damage of adjoining habitat from excavation activities and trampling from construction equipment.

If a Federal- or state-listed threatened or endangered species is encountered during construction within the ROI, all construction activities would cease and the USFWS or Georgia DNR would be notified for instruction on appropriate procedures to follow to ensure that the species were not adversely impacted.

As discussed in the effects of Alternative 4 on wildlife, the newly created lake in the ROI could actually serve as an ecological trap for wildlife, including sensitive and protected species, due to ongoing BASH management strategies. The lake could particularly attract bald eagles (state-listed as threatened), American alligators (federally listed as threatened due to similarity of appearance to American crocodile), and alligator snapping turtle (state-listed as threatened). Attracting the bald eagle is of particular concern as it is protected by the *Bald and Golden Eagle Protection Act*, which prohibits disturbances that could decrease eagles' productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or that causes nest abandonment. Continuous monitoring for bald eagles would be necessary if Alternative 4 is implemented to ensure individuals do not nest within or near the ROI.

The constructed 30-acre lake in Alternative 4 would be expected to attract several species of migratory waterfowl and other water birds, either as permanent habitat or stopover habitat during migrations. This would likely result in direct, long-term, minor, beneficial effects on migratory birds due to creation of new habitat; and direct, long-term, minor, adverse effects on migratory birds from the creation of a potential ecological trap due to ongoing BASH management.

Dredging and filling activities within the ROI should be conducted during the nonbreeding season. Otherwise, Alternative 4 could potentially result in a "take" of migratory birds' nests and eggs, which is prohibited under the *Migratory Bird Treaty Act* and would result in significant impacts on migratory birds. BMPs related to migratory bird species during construction discussed under Alternative 1 would also be implemented for Alternative 4.

## **Alternative 5 – Increased Access and Vegetation Management**

**Vegetation.** Direct, long-term, negligible to moderate, adverse effects on vegetation would be expected from the implementation of Alternative 5 within the ROI. Existing emergent and scrub-shrub vegetation within the ROI would be removed and the area would be planted with scrub-shrub vegetation dominated by titi, resulting in long-term, minor to moderate, adverse effects. As titi forms a low and dense canopy, little opportunity for the reestablishment of other plant species would occur. Construction of a new access road in the ROI would represent a permanent loss of emergent or scrub-shrub vegetation, resulting in long-term, negligible to minor, adverse effects. Additional direct, short-term, negligible to minor, adverse effects would be expected due to incidental damage of adjoining vegetation from excavation activities and trampling from construction equipment.

**Wildlife.** Short-term and long-term, minor to moderate, adverse effects on wildlife would be expected as a result of the implementation of Alternative 5 within the ROI. Direct, short-term, minor to moderate, adverse effects on wildlife would be expected due to disturbances associated with vegetation clearing and construction of an access road in the ROI. Temporary auditory, visual, and physical disturbances during these management activities would be expected to disrupt several wildlife species. Certain wildlife species adapted to noise and other disturbance levels associated with common activities on Moody AFB



(e.g., training activities including the use of blank ammunition, pyrotechnics, aircraft, military vehicles, and all-terrain vehicles) would be expected to return to the area after construction activities cease.

The long-term effects of Alternative 5 would be species-specific, as the removal of the existing emergent vegetation would adversely affect emergent wetland-associated species due to the permanent removal of emergent vegetation and open water foraging habitat, but would be beneficial for wildlife species that prefer dense shrub habitat. Therefore, Alternative 5 would be expected to have long-term adverse and beneficial effects on wildlife. Most species currently within the ROI would be expected to permanently relocate to adjoining habitats. Species with larger territories would be particularly impacted, as they might not be able to relocate to adjoining areas. Indirect, short-term and long-term, negligible to minor, adverse effects on wildlife within adjoining habitats would also be expected, as Alternative 5 would displace wildlife into existing territories, thereby increasing energy costs of individuals to defend their existing territories.

On the other hand, certain species might benefit from the new titi habitat. Titi provides dense cover than certain bird species might actually prefer, particularly the red-winged blackbird (*Agelaius phoeniceus*), which can nest in dense vegetation, including shrubs, and has been found to nest in black titi (*Cyrilla racemiflora*) (Stowers et al. 1968). Titi is also favored browse by white-tailed deer (*Odocoileus virginianus*); therefore, Alternative 5 could increase food availability in the ROI for white-tailed deer (Coladonato 1992). However, it is anticipated that the adverse effects on wildlife would outweigh the beneficial effects, as the new titi habitat is anticipated to be preferred by less species than the emergent vegetation habitat in the ROI.

Long-term, negligible to minor, adverse effects on wildlife would be expected from the construction of the road due to a minor loss in habitat and increased habitat fragmentation in the ROI from the road. As the road would only be used by an all-terrain vehicle, it is anticipated that it would be narrow and would still retain some native vegetation cover; therefore, effects would likely be negligible to minor. Increased BASH harassment capabilities in different areas of the ROI by the wildlife control specialist would result in short-term, minor, adverse effects on wildlife. Animals in the ROI are assumed to be relatively habituated to existing aircraft disturbances and BASH management disturbances, as the ROI is at the end of the runway and the wildlife control specialist already makes approximately three to four trips per day, 5 days per week (Griffin 2009). Therefore, effects from increased BASH management disturbances would be anticipated to be short-term in nature, as most individuals would likely return after disturbances have ceased.

Direct, long-term, minor to moderate, adverse effects on smaller, less-mobile species within the ROI could also occur as a result of direct mortality associated with collision with construction equipment. BMPs, such as stopping construction activities when wildlife is encountered, would be implemented to allow less-mobile species to avoid impacts from construction equipment. Additional BMPs include providing educational materials and briefing construction personnel on the potential species that might be encountered.

**Protected and Sensitive Species.** According to the INRMP, eight rare, threatened, and endangered species occur on Moody AFB (MAFB 2008a). The ROI contains potential habitat for the bald eagle, state-listed as threatened; wood stork, federally and state-listed as endangered; eastern indigo snake, federally and state-listed as threatened; American alligator, federally listed as threatened due to similarity of appearance to the American crocodile; and gopher tortoise, state-listed as threatened; therefore, a potential exists to encounter these species during implementation of Alternative 5. Wood storks have been observed foraging in the ROI (Lee 2009). Decreasing open water by planting titi would likely adversely affect wood storks due to a reduction in foraging habitat in the ROI; however, similar habitat occurs on adjoining lands and wood storks only occasionally use the ROI for foraging and do not nest or

roost in the ROI. Therefore, impacts from Alternative 5 on wood storks specifically are expected to be negligible to minor.

American alligators are commonly found on Moody AFB and have been observed within the ROI. Potential burrow habitat for the eastern indigo snake and gopher tortoise occurs along the edges of the south EOR wetlands in the upland areas (MAFB 2008a). Even though these areas would not likely be directly affected by Alternative 5, indirect adverse effects could be expected from incidental damage of adjoining habitat from excavation activities and trampling from construction equipment.

If a Federal- or state-listed threatened or endangered species is encountered during construction within the ROI, all construction activities would cease and the USFWS or Georgia DNR would be notified for instruction on appropriate procedures to follow to ensure that the species were not adversely impacted.

Construction of the access road within the ROI, which would involve vegetation removal, dredging, and placement of fill, should be conducted during the nonbreeding season. Otherwise, Alternative 5 could potentially result in a “take” of migratory birds’ nests and eggs, which is prohibited under the *Migratory Bird Treaty Act* and would result in significant impacts on migratory birds. BMPs related to migratory bird species during construction discussed under Alternative 1 would also be implemented for Alternative 5.

#### **Alternative 6 – No Action Alternative**

Under the No Action Alternative, the proposed management of the south EOR wetlands and southeastern corner wetlands would not occur. There would be no new impacts on vegetation; wildlife; or threatened, endangered, and other sensitive species under the No Action Alternative.

## 4. CUMULATIVE AND OTHER EFFECTS

### 4.1 Cumulative Impacts

Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

As discussed in **Section 1**, the south EOR and southeastern corner area of the runway make up the ROI for this EA.

### 4.2 Projects Considered for Potential Cumulative Impacts

Past, present, and reasonably foreseeable future actions contribute to the cumulative impacts scenario at Moody AFB and the ROI. Past projects and activities at Moody AFB contributing to cumulative impacts include current and past BASH management practices. In 2002, the USAF entered into a cooperative agreement with the USDA to conduct wildlife control in support of BASH management programs at Moody AFB. The USDA agreed to conduct additional depredation activities within Moody AFB as necessary to prevent against BASH incidents. The USDA program was implemented in conjunction with other BASH management strategies at Moody AFB. Other BASH management activities at Moody AFB include dispersal using horns, propane cannons, and pyrotechnic devices. Foreseeable future actions at Moody AFB include an expansion of sortie-operations within existing airspace components and ranges in the region.

### 4.3 Cumulative Effects on Resource Areas

**Safety.** The Proposed Action and reasonable alternatives, in combination with increased sortie-operations within existing airspace components and ranges, could have minor to moderate cumulative adverse effects on aircraft safety. An increase in take-offs and landings at Moody AFB's runway, in combination with potential increases in BASH risk associated with some alternatives, particularly Alternatives 3 and 4, could have a significant cumulative impact on aircraft safety at Moody AFB.

**Wetlands.** The Grand Bay-Banks Lake wetland complex composes more than 13,000 acres. Less than 1 percent of wetlands in the Grand Bay-Banks Lake wetland complex would be removed under Alternatives 2, 3, and 4 of the Proposed Action, which would be a minor loss on a regional scale. The south EOR and southeastern corner wetlands are regularly disturbed from clearcutting efforts to control tree growth near the runway and have altered hydrology from a series of drainage ditches and outfalls; therefore, the wetlands in the ROI are of a relatively lower value than the more pristine cypress swamps and marshes preserved in the nearby Georgia DNR-, USFWS-, and Nature Conservancy-owned lands. Additionally, based on the Federal government's "no net loss" policy, any wetlands removed from Moody AFB would need to be mitigated for in size and value elsewhere via methods such as wetland construction or mitigation banking. However, because the Grand Bay-Banks Lake wetland complex is the largest system of preserved Carolina Bays in Georgia and is one of the top protection priorities in Georgia based on its ecological values (TNC 2009), further fragmentation of the wetland complex that might result from the Proposed Action and future activities in the region could cause minor to moderate, adverse, cumulative

impacts on this wetland complex. The Grand Bay-Banks Lake Council (including representatives from Moody AFB), which meets quarterly to discuss the management of wetlands within the greater Grand Bay-Banks Lake ecosystem, should be contacted regarding the Proposed Action in order to solicit input on potential cumulative adverse effects on the Grand Bay-Banks Lake wetland complex.

**Biological Resources.** As discussed under cumulative impacts on wetlands, less than 1 percent of the wetlands within the Grand Bay-Banks Lake wetland complex would be removed under Alternatives 2, 3, and 4 of the Proposed Action, which would be a minor loss of wetland habitat on a regional scale. One of the greatest concerns for cumulative impacts would be from habitat fragmentation within this wetland complex. Removal of wetland habitat within the ROI, although itself a moderate to major impact on biological resources within the ROI, would not be expected to further fragment the Grand Bay-Banks Lake wetland complex significantly. However, due to previous and potential future development in the region, cumulative, minor to moderate, adverse impacts from converting all or a portion of the ROI to upland would be expected. It is anticipated that the large contiguous patches of wetland habitat in nearby Georgia DNR-, USFWS-, Georgia Department of Transportation-, and Nature Conservancy-owned lands, north and south of Moody AFB, will be permanently protected. If it is determined that the alternatives to implement the Proposed Action could adversely affect a threatened or endangered species, long-term cumulative adverse impacts on that species would be anticipated. Cumulative, long-term, minor, beneficial effects on biological resources could be anticipated from the creation of a lake in Alternatives 3 and 4, which would provide additional permanent habitat for open water species and stopover habitat during migrations.

Negligible cumulative impacts on noise, air quality, and socioeconomic resources would be expected as the Proposed Action would only contribute a minor amount to the cumulative scenario for these resources.

#### 4.4 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action.

Construction activities associated with the Proposed Action would include the use of fossil fuels, a nonrenewable natural resource. The use of nonrenewable resources in the operations of construction equipment and vehicles would be unavoidable. Relatively small amounts of energy resources would be committed to the Proposed Action are not considered significant.

#### 4.5 Relationship between the Short-term Use of the Environment and Long-term Productivity

Short-term uses of the biophysical components of the human environment include impacts associated with the Proposed Action that would occur over a period of less than 5 years. Long-term uses of the human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss. Several kinds of activities could result in short-term resource uses that compromise long-term productivity. For example, filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in significant intensification of land use within the ROI or in the surrounding area.



## 4.6 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame (e.g., energy and minerals). The irreversible and irretrievable commitments of resources that would result from implementation of the Proposed Action involve the consumption of material resources used for construction, energy resources, land, and human labor resources. The use of these resources is considered to be permanent.

Energy resources utilized for the Proposed Action would be irretrievably lost. These include petroleum-based products used by construction equipment and vehicles. However, consumption of petroleum resources would be minimal and would not place a significant demand on their availability in the region. Therefore, no significant impacts would be expected.

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**APPENDIX A**  
**APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA**



## Appendix A

### Applicable Laws, Regulations, Policies, and Planning Criteria

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When considering the affected environment, the various physical, biological, economic, and social environmental factors must be considered. In addition to the National Environmental Policy Act (NEPA), there are other environmental laws as well as Executive Orders (EOs) to be considered when preparing environmental analyses. These laws are summarized below.

NOTE: This is not a complete list of all applicable laws, regulations, policies, and planning criteria potentially applicable to documents, however, it does provide a general summary for use as a reference.

#### Airspace

Airspace management in the U.S. Air Force (USAF) is guided by Air Force Instruction (AFI) 13-201, *Air Force Airspace Management*. This AFI provides guidance and procedures for developing and processing special use airspace (SUA). It covers aeronautical matters governing the efficient planning, acquisition, use, and management of airspace required to support USAF flight operations. It applies to activities that have operational or administrative responsibility for using airspace, establishes practices to decrease disturbances from flight operations that might cause adverse public reaction, and provides flying unit commanders with general guidance for dealing with local problems.

#### Noise

The Air Installation Compatible Use Zone (AICUZ) Program, (AFI 32-7063), provides guidance to air bases and local communities in planning land uses compatible with airfield operations. The AICUZ program describes existing aircraft noise and flight safety zones on and near USAF installations.

#### Land Use

Land use planning in the USAF is guided by *Land Use Planning Bulletin, Base Comprehensive Planning* (HQ USAF/LEEVX, August 1, 1986). This document provides for the use of 12 basic land use types found on a USAF installation. In addition, land use guidelines established by the U.S. Department of Housing and Urban Development (HUD) and based on findings of the Federal Interagency Committee on Noise (FICON) are used to recommend acceptable levels of noise exposure for land use.

#### Air Quality

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990, recognizes that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of the Nation's air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQSs) which regulate carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and designates this responsibility to state and local governments. States are directed to utilize financial and technical assistance as well as leadership from the Federal government to develop implementation plans to achieve NAAQS. Geographic areas are officially designated by the USEPA as being in attainment or nonattainment to pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCRs). Pollutant concentration levels are measured at

designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassifiable. Section 309 of the CAA authorizes USEPA to review and comment on impact statements prepared by other agencies.

An agency should consider what effect an action might have on NAAQS due to short-term increases in air pollution during construction as well as long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a Federal agency could also be subject to USEPA's Prevention of Significant Deterioration (PSD) regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives Federal immunity from complying with the CAA and states all Federal agencies will comply with all Federal- and state-approved requirements.

The General Conformity Rule requires that any Federal action meet the requirements of a State Implementation Plan (SIP) or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS, contribute to an increase in the frequency or severity of violations of NAAQS, or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

The General Conformity Rule applies only to actions in nonattainment or maintenance areas and considers both direct and indirect emissions. The rule applies only to Federal actions that are considered "regionally significant" or where the total emissions from the action meet or exceed the *de minimis* thresholds presented in 40 Code of Federal Regulations (CFR) 93.153. An action is regionally significant when the total nonattainment pollutant emissions exceed 10 percent of the AQCR's total emissions inventory for that nonattainment pollutant. If a Federal action does not meet or exceed the *de minimis* thresholds and is not considered regionally significant, then a full Conformity Determination is not required.

## **Safety**

AFI 91-202, *USAF Mishap Prevention Program*, implements Air Force Policy Directive (AFPD) 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the Bird/Wildlife Aircraft Strike Hazard [BASH] Program), assigns responsibilities for program elements, and contains program management information. This instruction applies to all USAF personnel.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFPD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements. This instruction applies to all USAF activities.

## **Geological Resources**

Recognizing that millions of acres per year of prime farmland are lost to development, Congress passed the Farmland Protection Policy Act to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland (7 CFR Part 658). Prime farmland are soils that have a combination of soil and landscape properties that make them highly suitable for cropland, such as high inherent fertility, good water-holding capacity, deep or thick effective rooting zones, and are not subject to periodic flooding. Under the Farmland Protection Policy Act, agencies are encouraged to conserve prime or unique farmlands when alternatives are practicable. Some activities that are not subject



to the Farmland Protection Policy Act include Federal permitting and licensing, projects on land already in urban development or used for water storage, construction for national defense purposes, or construction of new minor secondary structures such as a garage or storage shed.

## **Water Resources**

The Clean Water Act (CWA) of 1977 is an amendment to the Federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into U.S. waters. The CWA requires USEPA to establish water quality standards for specified contaminants in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued by USEPA or the appropriate state if it has assumed responsibility. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE). Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water-quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a waterbody can receive and still be in compliance with state water-quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source to meet the state standards. The TMDL program is currently the Nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL plans typically calls for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

EO 11988, *Floodplain Management* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. An agency may locate a facility in a floodplain if the head of the agency finds there is no practicable alternative. If it is found there is no practicable alternative, the agency must minimize potential harm to the floodplain, and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted flood proofing and flood protection to include elevating structures above the base flood level rather than filling in land.

## **Biological Resources**

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretaries of the Interior and Commerce, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintain the list. A list of Federal endangered species can be obtained from the Endangered Species Division, USFWS (703-358-2171). States might also have their own lists of threatened and endangered species which can be obtained

by calling the appropriate State Fish and Wildlife office. Some species, such as the bald eagle, also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport or carry from one state, territory, or district to another, or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

EO 11514, *Protection and Enhancement of Environmental Quality* (March 5, 1970), states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

EO 13186, *Conservation of Migratory Birds* (January 10, 2001), creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

## **Cultural Resources**

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). ACHP advises the President, Congress, and Federal agencies on historic preservation issues. Section 106 of the NHPA directs Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned

cultural properties. Section 106 of the act is implemented by regulations of the ACHP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions which qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the area of potential effects, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires Federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

The Archaeological Resource Protection Act (ARPA) of 1979 protects archaeological resources on public and American Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archaeological resources are excavated or removed from public lands, the Federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archaeological resources between governmental agencies, the professional archaeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 establishes rights of American Indian tribes to claim ownership of certain “cultural items,” defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by Federal agencies. Cultural items discovered on Federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined, and then the tribe owning the land where the items were discovered or the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on Federal or tribal land must be reported to the appropriate American Indian tribe and the Federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, *Protection and Enhancement of the Cultural Environment* (May 13, 1971), directs the Federal government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all Federal sites under their jurisdiction or control which might qualify for listing on the NRHP. Agencies must allow the ACHP to comment on the alteration, demolition, sale, or transfer of property which is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally owned sites listed on the NRHP.

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of Federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their actions and policies to determine if changes should be made to protect and preserve the religious cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

EO 13007, *Indian Sacred Sites* (May 24, 1996), provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate American Indian religious practitioners’ access to and ceremonial use of American Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality

of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13287, *Preserve America* (March 3, 2003), orders Federal agencies to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. EO 13287 established new accountability for agencies with respect to inventories and stewardship.

## **Socioeconomics and Environmental Justice**

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), directs Federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address the adverse human health or environmental effects that its activities have on minority and low-income populations and develop agency wide environmental justice strategies. The strategy must list “programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health of and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations.” A copy of the strategy and progress reports must be provided to the Federal Working Group on Environmental Justice. Responsibility for compliance with EO 12898 is with each Federal agency.

**APPENDIX B**  
**INTERAGENCY AND INTERGOVERNMENTAL COORDINATION**  
**FOR ENVIRONMENTAL PLANNING**





## IICEP Distribution List

### Federal

The Honorable Sanford C. Bishop, Jr.  
U.S. House of Representatives  
401 North Patterson Street  
Federal Building Room 255  
Valdosta, GA 31601

The Honorable Jack Kingston  
U.S. House of Representatives  
P.O. Box 5264  
Valdosta, GA 31603-5264

The Honorable Johnny Isakson  
U.S. Senate  
1 Overton Park  
3625 Cumberland Blvd, Suite 970  
Atlanta, GA 30339

The Honorable Saxby Chambliss  
U.S. Senate  
416 Russell Senate Office Building  
Washington, DC 20515

Savannah District, Regulatory Division  
U.S. Army Corps of Engineers  
ATTN: CESAS-RD  
Post Office Box 889  
100 West Oglethorpe Ave.  
Savannah, GA 31402

Albany Area Office  
U.S. Army Corps of Engineers  
1104 North Westover Road  
Unit 9  
Albany, GA 31707

Mr. Strant Colwell  
Assistant Field Supervisor  
Brunswick Field Office, USFWS  
4270 Norwich Sreet  
Brunswick, GA 31520

### State

Mr. Chris Bauman  
Regional Supervisor  
Georgia Department of Natural Resources  
1773-A Bowen's Mill Highway  
Fitzgerald, GA 31750

Ms. Barbara Jackson  
SPOC, Georgia State Clearinghouse  
270 Washington Street Southwest  
8th Floor  
Atlanta, GA 30334

Ms. Serena Bellew  
State Historic Preservation Officer  
47 Trinity Ave Southwest  
Suite 414-H  
Atlanta, GA 30334

### Local

Mr. John J. Fretti  
Mayor, City of Valdosta  
316 East Central Avenue  
Valdosta, GA 31601

Mr. Ashley Paulk  
Chairman, Lowndes County Board of  
Commissioners  
325 West Savannah Ave  
Valdosta, GA 31601

Dr. Jack M. Lockhart  
Department of Biology  
Valdosta State University  
1500 N Patterson Street  
Valdosta, GA 31698-0100

Dr. Brad Bergstrom, Chair  
Department of Biology  
1500 N. Patterson St.  
Valdosta State University  
Valdosta, GA 31698-0015



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: The Honorable Sanford C. Bishop, Jr.  
U.S. House of Representatives  
401 North Patterson Street  
Federal Building Room 255  
Valdosta, GA 31601

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Moody Air Force Base (AFB) proposes to implement the intentional management of the wetlands at the south end of runway (EOR) at Moody AFB to reduce bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the intentional management is to reduce the attractiveness of this area to birds and other wildlife that pose an increased BASH risk to Moody AFB pilots and aircraft. The attached map (Figure 1) shows the areas proposed for management and the delineated jurisdictional wetlands and other waters of the United States within the EOR wetland.
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3. If you have any specific questions relative to the proposal, or wish to receive a copy of the findings, please contact Ms. Thackston at (229) 257-2396 or by e-mail at [johnna.thackston@moody.af.mil](mailto:johnna.thackston@moody.af.mil).

GREG A. WILLIAMS, Lt Col, USAF  
Commander

Attachment  
Figure 1 – Location of Proposed Action, Moody Air Force Base

*Global Power for America*





**Figure 1. Location of the Proposed Action, Moody Air Force Base**





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: The Honorable Jack Kingston  
U.S. House of Representatives  
P.O. Box 5264  
Valdosta, GA 31603-5264

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: The Honorable Johnny Isakson  
U.S. Senate  
1 Overton Park  
3625 Cumberland Blvd, Suite 970  
Atlanta, GA 30339

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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GREG A. WILLIAMS, Lt Col USAF  
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Attachment  
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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: The Honorable Saxby Chambliss  
U.S. Senate  
416 Russell Senate Office Building  
Washington, DC 20515

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Savannah District, Regulatory Division U.S. Army Corps of Engineers  
ATTN: CESAS-RD  
Post Office Box 889  
100 West Oglethorpe Ave.  
Savannah GA 31402

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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GREG A. WILLIAMS, Lt Col USAF  
Commander

Attachment  
Figure 1 - Location of Proposed Action, Moody Air Force Base

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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Mr. Strant Colwell  
Assistant Field Supervisor  
Brunswick Field Office, USFWS  
4270 Norwich Street  
Brunswick, GA 31520

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Albany Area Office  
U.S. Army Corps of Engineers  
1104 North Westover Road  
Unit 9  
Albany, GA 31707

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Ms. Barbara Jackson  
SPOC, Georgia State Clearinghouse  
270 Washington Street Southwest  
8th Floor  
Atlanta, GA 30334

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Ms. Serena Bellew  
State Historic Preservation Officer  
47 Trinity Ave Southwest  
Suite 414-H  
Atlanta, GA 30334

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Mr. John J. Pretti  
Mayor, City of Valdosta  
316 East Central Avenue  
Valdosta, GA 31601

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

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*Global Power for America*





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Mr. Ashley Paulk  
Chairman, Lowndes County Board of Commissioners  
325 West Savannah Ave  
Valdosta, GA 31601

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

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3. If you have any specific questions relative to the proposal, or wish to receive a copy of the findings, please contact Ms. Thackston at (229) 257-2396 or by e-mail at [johnna.thackston@moody.af.mil](mailto:johnna.thackston@moody.af.mil).

GREG A. WILLIAMS, Lt Col, USAF  
Commander

Attachment  
Figure 1 – Location of Proposed Action, Moody Air Force Base  
Figure 1

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Dr. Jack M. Lockhart  
Department of Biology  
Valdosta State University  
1500 N Patterson Street  
Valdosta, GA 31698-0100

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Moody Air Force Base (AFB) proposes to implement the intentional management of the wetlands at the south end of runway (EOR) at Moody AFB to reduce bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the intentional management is to reduce the attractiveness of this area to birds and other wildlife that pose an increased BASH risk to Moody AFB pilots and aircraft. The attached map (Figure 1) shows the areas proposed for management and the delineated jurisdictional wetlands and other waters of the United States within the EOR wetland.

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GREG A. WILLIAMS, Lt Col USAF  
Commander

Attachment  
Figure 1 - Location of Proposed Action, Moody Air Force Base

*Global Power for America*





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Dr. Brad Bergstrom, Chair  
Department of Biology  
1500 N. Patterson St.  
Valdosta State University  
Valdosta, GA 31698-0015

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Moody Air Force Base (AFB) proposes to implement the intentional management of the wetlands at the south end of runway (EOR) at Moody AFB to reduce bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the intentional management is to reduce the attractiveness of this area to birds and other wildlife that pose an increased BASH risk to Moody AFB pilots and aircraft. The attached map (Figure 1) shows the areas proposed for management and the delineated jurisdictional wetlands and other waters of the United States within the EOR wetland.
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GREG A. WILLIAMS, Lt Col USAF  
Commander

Attachment  
Figure 1 – Location of Proposed Action, Moody Air Force Base

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

MEMORANDUM FOR: Mr. Chris Bauman  
Regional Supervisor  
Georgia Department of Natural Resources  
1773-A Bowen's Mill Highway  
Fitzgerald, GA 31750

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB GA 31699-1707

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Moody Air Force Base (AFB) proposes to implement the intentional management of the wetlands at the south end of runway (EOR) at Moody AFB to reduce bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the intentional management is to reduce the attractiveness of this area to birds and other wildlife that pose an increased BASH risk to Moody AFB pilots and aircraft. The attached map (Figure 1) shows the areas proposed for management and the delineated jurisdictional wetlands and other waters of the United States within the EOR wetland.

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GREG A. WILLIAMS, Lt Col USAF  
Commander

Attachment  
Figure 1 - Location of Proposed Action, Moody Air Force Base

*Global Power for America*




## OFFICE OF PLANNING AND BUDGET

Sonny Perdue  
Governor

Trey Childress  
Director

### GEORGIA STATE CLEARINGHOUSE MEMORANDUM EXECUTIVE ORDER 12372 REVIEW PROCESS

TO: Johnna Thackston  
Dept. of the Air Force  
23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699-1707

FROM: Barbara Jackson   
Georgia State Clearinghouse

DATE: May 1, 2009

SUBJECT: Proposed Implementation of Intentional Management of Wetlands  
at Moody AFB, GA

I received your correspondence concerning the above on May 1, 2009. Georgia State Clearinghouse itself does not have the knowledge or expertise to provide input concerning environmental issues. Our primary function will be to coordinate intergovernmental review processing of this project once the EA is ready.

Although I will forward on the material included, I must inform you that some of the state's reviewing agencies may opt not to provide *preliminary* comments on proposed projects, instead, waiting to review the EA itself through Clearinghouse's intergovernmental review process.

Once ready, for this particular project, we ask that you submit six (6) copies along with 1 brief cover letter/memo. If this is a large document, the copies can be submitted on cds; however, we request at least one be a hard (paper) copy.

/bj

Office: 404-656-3855

AN EQUAL OPPORTUNITY EMPLOYER  
270 Washington Street, S.W., Atlanta, Georgia 30334

Fax: 404-656-7916

From: Kobs, Terry C.  
Sent: Monday, May 11, 2009 11:02 AM  
To: Thackston, Johnna L Civ USAF ACC 23 CES/CEAO  
Subject: Proposed Implementation of Intentional Management of Wetland at Moody AFB

Ms. Thackston,

We have received a notice of the proposed implementation of intentional management of wetlands at Moody AFB. Based on the limited information provided the proposed management activities would occur within wetlands located off the southern end of the main runway on Moody AFB. Please be aware that impacts to these wetlands would likely require prior authorization from the US Army Corps of Engineers, Regulatory Division. Please feel free to contact me with any questions or concerns.

Thanks,

Terry C. Kobs

Regulatory Specialist, Coastal Branch

Albany Field Office

From: J. Mitchell Lockhart  
Sent: Wednesday, May 13, 2009 9:55 AM  
To: Thackston, Johnna L Civ USAF ACC 23 CES/CEAO  
Subject: South EOR wetland management

Johnna,

Could you please send me a copy of the EA of the findings for this management action when it becomes available?

Thanks!

Mitch

Dr. J. Mitchell Lockhart  
Professor of Biology  
Valdosta State University  
1500 North Patterson Street  
Valdosta, GA 31698



## Georgia Department of Natural Resources

### Historic Preservation Division

Chris Clark, Commissioner

W. Ray Luce, Division Director and Deputy State Historic Preservation Officer  
34 Peachtree Street, NW, Suite 1600, Atlanta, Georgia 30303-2316  
Telephone (404) 656-2840 Fax (404) 657-1040 <http://www.gashpo.org>

May 19, 2009

Greg Williams,  
Lieutenant Colonel, USAF  
Commander  
Department of the Air Force  
**Attention: Johnna Thackston**  
23 CBS/CC  
3485 Georgia Street  
Moody Air Force Base, Georgia 31699-1707

**RE: Moody AFB: Wetlands Management, South End of Runway**  
**Lowndes County, Georgia**  
**HP-090501-015**

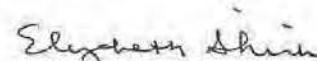
Dear Lieutenant Colonel Williams:

The Historic Preservation Division (HPD) has received initial information submitted concerning the above referenced project. Our comments are offered to assist US Department of the Air Force (USAF) and its applicants in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Thank you for notifying us of this proposed project. Your notice dated April 27, 2009, will serve as initiation of the Section 106 review process. We look forward to receiving Section 106 compliance materials from you when they become available.

Please refer to project number **HP-090501-015** in future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact me at (404) 651-6624, or Michelle Volkema, Environmental Review Specialist, at (404) 651-6546.

Sincerely,



Elizabeth Shirk  
Environmental Review Coordinator

ES:mav

cc: Julia Swechuck, South Georgia RDC

**APPENDIX C**  
**PUBLIC INVOLVEMENT**



**PUBLIC NOTICE**

**Notice of Availability  
for the Draft Environmental Assessment  
for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia**

**Moody Air Force Base (AFB), Georgia** – The U.S. Air Force has prepared a Draft Environmental Assessment (EA) for the proposed implementation of a management program for the wetlands at the south end of runway (BOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

The identified options for achieving this goal are presented in the Draft EA as five management alternatives and one No Action Alternative. The five management alternatives are (1) concentration of surface water within the wetland complex with multiple parallel ditches, (2) complete filling of the wetland complex, (3) dredging of wetlands to create a lake, (4) partial dredge and fill, and (5) increased access and vegetation management. At this time, the U.S. Air Force requests your comments on the Proposed Action alternatives as discussed in the Draft EA. The U.S. Air Force will select a Preferred Alternative after careful consideration of all comments received on the Draft EA and identify the Preferred Alternative decision in the Final EA in accordance with Title 40 Code of Federal Regulations (CFR) section 1502.14(e).

Copies of the Draft EA are available for review at the South Georgia Regional Library, 300 Woodrow Wilson Drive, Valdosta, GA 31602; Moody AFB Library, 3209 Mitchell Blvd, Moody AFB, GA 31699; and the Lanier County Public Library, 124 South Valdosta Road, Lakeland, GA 31635. Public comments on the Draft EA will be accepted for 30 days from the date of this publication.

To request a copy of the EA on CD, please contact the 23rd Wing Public Affairs Office at (229) 257-3395. Written comments and inquiries on the Draft EA should be directed to Ms. Johnna Thackston, [johnna.thackston@moody.af.mil](mailto:johnna.thackston@moody.af.mil), Moody AFB Asset Flight Management Flight, 23 CES/CEAO, 3485 Georgia Street, Moody AFB, GA 31699.







DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR MS. BARBARA JACKSON

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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3. The public comment period for this EA is 30 days. Please provide any written comments by 5:00 p.m. on 31 December 2009 to Ms. Johnna Scepansky at the above address. If you have any questions, please feel free to contact Ms. Scepansky by telephone at (229) 257-2396 or by email at [johnna.scepansky@moody.af.mil](mailto:johnna.scepansky@moody.af.mil). Thank you for your participation.

THOMAS A. BONGIOVI, Lt Col, USAF  
Commander

Attachment  
*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR THE HONORABLE SANFORD C. BISHOP, JR.

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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THOMAS A. BONGIOVI, Lt Col, USAF  
Commander

Attachment

*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR SAVANNAH DISTRICT, REGULATORY DIVISION  
UNITED STATES ARMY CORPS OF ENGINEERS

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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THOMAS A. BONGIOVI, Lt Col, USAF  
Commander

Attachment

*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR MR. CHRIS BAUMAN

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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THOMAS A. BONGIOVI, Lt Col USAF  
Commander

Attachment  
*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
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*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR DR. BRAD BERGSTROM, CHAIR

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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THOMAS A. BONGIOVE, Lt Col, USAF  
Commander

Attachment

*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR THE HONORABLE SAXBY CHAMBLISS

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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Commander

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*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR MR. STRANT COLWELL

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

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THOMAS A. BONGIOVANNI, Lt Col, USAF  
Commander

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*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR DR. DAVID CRASS

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.
2. The identified options for achieving this goal are presented in the Draft EA as five management alternatives and one No Action Alternative. The five management alternatives are (1) concentration of surface water within the wetland complex with multiple parallel ditches, (2) complete filling of the wetland complex, (3) dredging of wetlands to create a lake, (4) partial dredge and fill, and (5) increased access and vegetation management. At this time, the U.S. Air Force requests your comments on the Proposed Action alternatives as discussed in the Draft EA. The U.S. Air Force will select a Preferred Alternative after careful consideration of all comments received on the Draft EA and identify the Preferred Alternative decision in the Final EA in accordance with Title 40 Code of Federal Regulations (CFR) section 1502.14(e).
3. The public comment period for this EA is 30 days. Please provide any written comments by 5:00 p.m. on 31 December 2009 to Ms. Joanna Scepanisky at the above address. If you have any questions, please feel free to contact Ms. Scepanisky by telephone at (229) 257-2396 or by email at [joanna.scepanisky@moody.af.mil](mailto:joanna.scepanisky@moody.af.mil). Thank you for your participation.

THOMAS A. BONGIOVANNI, Lt Col, USAF  
Commander

Attachment  
*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR MR. JOHN FRETTI

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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Commander

Attachment

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*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR THE HONORABLE JOHNNY ISAKSON

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.
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Commander

Attachment  
*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR THE HONORABLE JOHNNY ISAKSON

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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THOMAS A. BONGIOVI, Lt Col, USAF  
Commander

Attachment

*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR THE HONORABLE JACK KINGSTON

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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Commander

Attachment  
*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR MR. TERRY KOBS

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.
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Attachment  
*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*





DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR DR. JACK M. LOCKHART

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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Attachment  
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at Moody AFB, Georgia*

*Global Power for America*



DEPARTMENT OF THE AIR FORCE  
23RD CIVIL ENGINEER SQUADRON (ACC)  
MOODY AIR FORCE BASE GEORGIA

NOV 18 2009

MEMORANDUM FOR MR. ASHLEY PAULK

FROM: 23 CES/CC  
3485 Georgia Street  
Moody AFB, GA 31699

SUBJECT: Proposed Implementation of Intentional Management of Wetlands at Moody AFB

1. Enclosed please find a copy of the Draft Environmental Assessment (EA) the U.S. Air Force has prepared for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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THOMAS A. BONGIOVI, Lt Col, USAF  
Commander

Attachment

*Draft Environmental Assessment for Management of the South End of Runway Wetlands  
at Moody AFB, Georgia*

*Global Power for America*







November 30, 2009

Moody AFB Library  
3209 Mitchell Blvd  
Moody AFB, GA 31699

Dear Sir or Madam:

The public notice shown below is to be published in the *Valdosta Daily Times* on November 30, 2009. Please place the enclosed copy of the Draft Environmental Assessment either on reserve or in the reference section of your library. Members of the public have been invited to review the document at your library until December 31, 2009. The document should not leave the library. Your assistance is appreciated.

#### PUBLIC NOTICE

##### Notice of Availability for the Draft Environmental Assessment for Management of the South End of Runway Wetlands at Moody AFB, Georgia

**Moody Air Force Base (AFB), Georgia** — The U.S. Air Force has prepared a Draft Environmental Assessment (EA) for the proposed implementation of a management program for the wetlands at the south end of runway (EOR) at Moody Air Force Base (AFB). This initiative is intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft using the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

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Copies of the Draft EA are available for review at the South Georgia Regional Library, 300 Woodrow Wilson Drive, Valdosta, GA 31602; Moody AFB Library, 3209 Mitchell Blvd, Moody AFB, GA 31699; and the Lanier County Public Library, 124 South Valdosta Road, Lakeland, GA 31635. Public comments on the Draft EA will be accepted through December 31, 2009.

To request a copy of the EA on CD, please contact the 23rd Wing Public Affairs Office at (229) 257-3395. Written comments and inquiries on the Draft EA should be directed to Ms. Johnna Scepansky, [johnna.scepansky@moody.af.mil](mailto:johnna.scepansky@moody.af.mil), Moody AFB Asset Flight Management Flight, 23 CES/CEAO, 3485 Georgia Street, Moody AFB, GA 31699.

If you have any questions, please contact me at (830) 980-4702. Thank you.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Stephen G. Pyle'.

Stephen G. Pyle  
Project Manager  
engineering-environmental Management, Inc.

2751 Prosperity Avenue, Suite 200, Fairfax, Virginia 22031 • (703) 762-7755 • Fax (703) 762-7754

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November 30, 2009

Lanier County Public Library  
124 South Valdosta Road  
Lakeland, GA 31635

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DENVER • JACKSONVILLE • PHILADELPHIA • SACRAMENTO • SAN ANTONIO • SAN DIEGO • TULSA • WASHINGTON, DC



November 30, 2009

South Georgia Regional Library  
300 Woodrow Wilson Drive  
Valdosta, GA 31602

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Stephen G. Pyle  
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## Notice of Availability for Signed Finding of No Significant Impact

### NOTICE OF AVAILABILITY OF FINDING OF NO SIGNIFICANT IMPACT (FONSI)

**Moody Air Force Base (AFB), Georgia** – The U.S. Air Force announces the availability of the FONSI for the Final Environmental Assessment (EA) that addresses the proposed action of implementing a management program for the wetlands at the south end of runway (EOR) at Moody AFB. This initiative was intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft that use the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB.

The identified options for achieving this goal are presented in the Final EA as five management alternatives and one No Action Alternative. The five management alternatives are (1) concentration of surface water within the wetland complex with multiple parallel ditches, (2) complete filling of the wetland complex, (3) dredging of wetlands to create a lake, (4) partial dredge and fill, and (5) increased access and vegetation management.

The analysis in the Final EA led the U.S. Air Force to conclude that no action will be taken at this time on the proposed action. The U.S. Air Force is adopting the No Action Alternative as its preferred alternative and, therefore, a FONSI is warranted. The Final EA and FONSI are available by request from Ms. Rebecca Lopez, 23 CES/CEA, 3485 Georgia Street, Moody AFB GA 31699-1707; 229-257-2396.



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Each student began  
preparing for the Valdosta  
Area Beef Show and Sale  
in March and April of  
2010 when they purchased  
a steer to be raised for the  
event.

From the moment the  
cattle were brought home,  
students began working  
on improving the animal's  
posture, which Harrison  
said is important for show  
cattle.

Every day, the students  
had to wash, brush and  
blow dry the animal's hair  
in order to "shape them  
up so the hair will go one  
way and look better," he  
said.

Other daily responsi-  
bilities included feeding  
and exercising the cattle.

From May of 2010 to  
February, the students  
participated in eight  
shows to help prepare for  
the beef show and sale.

There will also be a  
champion area race,  
where steers and heifers  
from farms in Lowndes,  
Brooks and Echols coun-  
ties, where the calf was  
born, will compete.

The showmanship  
competition will follow.  
The students will compete  
in three divisions —  
youth, junior and senior  
showmanship.

"The junior showman-  
ship is the largest group  
of students this year,"  
Harrison said. "That will  
be very, very competitive."

Steers will be shown by  
weight class and judged  
on muscle, how well they  
walk, etc.

Awards will be present-  
ed to the champion steer  
and reserve champion  
steer.

Winners will be an-  
nounced before the end of  
the night.

Champion and reserve

associated with caring for  
their steer or heifer the  
past year, Harrison said.

"One thing they're  
learning (is) a lot about  
responsibility because  
these animals have to be  
cared for daily," he said.  
"That's not saying the par-  
ents don't help out some  
(because) it becomes a  
family project."

The students learn re-  
sponsibility as they  
groom, exercise, feed and

Students handling  
haifers learn the breeding  
process and are able to  
"understand the basics of  
animal reproduction,"  
Harrison said.

"These students have  
learned a lot," he said.  
"It's become a passion for  
many of them."

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## NOTICE OF AVAILABILITY OF FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Moody Air Force Base (AFB), Georgia - The U.S. Air Force announces the availability of the FONSI for the Final Environmental Assessment (EA) that addresses the proposed action of implementing a management program for the wetlands at the south end of runway (EOR) at Moody AFB. This initiative was intended to reduce the bird/wildlife aircraft strike hazard (BASH) risk to pilots and aircraft that use the Moody AFB runway or the airspace in the vicinity of the runway. The goal for the management of these wetlands is to reduce the attractiveness of this area to birds and other wildlife that pose the BASH risk at Moody AFB. The identified options for achieving this goal are presented in the Final EA as five management alternatives and one No Action Alternative.

The Final EA provides an assessment of potential environmental impacts resulting from the proposed action and alternatives. The analysis led the U.S. Air Force to conclude that no action will be taken at this time on the proposed action. The U.S. Air Force is adopting the No Action Alternative as its preferred alternative and, therefore, a FONSI is warranted. The Final EA and FONSI are available by request from Ms. Rebecca Lopez, 23 GES/CEA, 3485 Georgia Street, Moody AFB GA 31699-1707, 229-257-2396.

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LAND: About 125 pages of

**APPENDIX D**  
**PHOTO DOCUMENTATION**





## Appendix D

### Representative Site Photos

	
<b>South EOR facing the Runway</b>	<b>South EOR Wetland Area</b>
	
<b>Culvert under perimeter access road</b>	<b>Culvert under perimeter access road</b>
	
<b>Western side of south EOR wetland complex</b>	<b>Culvert draining into South EOR wetlands</b>

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## **APPENDIX E**

### **AIR QUALITY CALCULATIONS**





<b>Summary</b>	Summarizes total emissions by calendar year (assume construction occurs in 2010) for each alternative
<b>Combustion</b>	Estimates emissions from non-road equipment exhaust as well as painting
<b>Construction Commuter Emissions</b>	Estimates the total emissions from privately-owned vehicles from construction workers traveling to the site
<b>Tier Report</b>	Summarizes total emissions for the Counties of Lanier and Lowndes Tier Reports for 2002, to be used to compare project to regional emissions
<b>Note</b>	See individual calculation spreadsheets for emission calculation methodologies and references

Air Quality Emissions from Proposed Action						
	NO <sub>x</sub> (ton)	VOC (ton)	CO (ton)	SO <sub>2</sub> (ton)	PM <sub>10</sub> (ton)	CO <sub>2</sub> (metric ton)
Alternative 1 Combustion	11.781	1.949	16.246	0.471	0.345	1319.53
Alternative 1 Commuter	0.052	0.079	22.042	0.000	0.001	20.00
TOTAL ALTERNATIVE 1	11.833	2.028	38.288	0.471	0.345	1339.53

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

#### Lanier and Lowndes Counties Georgia

Year	Regional Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002	6,595	10,783	54,765	2,135	10,977

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Site visited on 7 May 2009.

#### Determination Significance (Significance Threshold = 10%)

	Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002 Regional Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 1 2010 Emissions	11.833	2.028	38.288	0.471	0.345
Proposed Action % of Regional Emissions	0.179%	0.019%	0.070%	0.022%	0.003%

Air Quality Emissions from Proposed Action						
	NO <sub>x</sub> (ton)	VOC (ton)	CO (ton)	SO <sub>2</sub> (ton)	PM <sub>10</sub> (ton)	CO <sub>2</sub> (metric ton)
Alternative 2 Combustion	45.711	7.612	63.639	1.828	1.327	4008.37
Alternative 2 Commuter	1.614	0.242	0.000	0.000	0.002	61.53
TOTAL ALTERNATIVE 2	47.325	7.854	63.639	1.828	1.329	4069.90

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

**Lanier and Lowndes Counties Georgia**

Year	Regional Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002	6,595	10,783	54,765	2,135	10,977

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Site visited on 7 May 2009.

**Determination Significance (Significance Threshold = 10%)**

	Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002 Regional Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 2 2010 Emissions	47.325	7.854	63.639	1.828	1.329
Proposed Action % of Regional Emissions	0.718%	0.073%	0.116%	0.086%	0.012%



Air Quality Emissions from Proposed Action						
	NO <sub>x</sub> (ton)	VOC (ton)	CO (ton)	SO <sub>2</sub> (ton)	PM <sub>10</sub> (ton)	CO <sub>2</sub> (metric ton)
Alternative 3						
Alternative 3 Combustion	59.846	10.041	84.284	2.394	1.720	6656.08
Alternative 3 Commuter	0.196	0.296	0.000	0.000	0.003	75.37
TOTAL ALTERNATIVE 3	60.042	10.337	84.284	2.394	1.722	6731.45

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

#### Lanier and Lowndes Counties Georgia

Year	Regional Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002	6,595	10,783	54,765	2,135	10,977

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Site visited on 7 May 2009.

#### Determination Significance (Significance Threshold = 10%)

	Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002 Regional Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 3 2010 Emissions	60.042	10.337	84.284	2.394	1.722
Proposed Action % of Regional Emissions	0.910%	0.096%	0.154%	0.112%	0.016%

Air Quality Emissions from Proposed Action						
	NO <sub>x</sub> (ton)	VOC (ton)	CO (ton)	SO <sub>2</sub> (ton)	PM <sub>10</sub> (ton)	CO <sub>2</sub> (metric ton)
Alternative 4 Combustion	47.480	7.927	66.357	1.899	1.374	4359.18
Alternative 4 Commuter	0.132	0.199	0.000	0.000	0.002	50.76
TOTAL ALTERNATIVE 4	47.612	8.126	66.357	1.899	1.376	4409.94

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

**Lanier and Lowndes Counties Georgia**

Year	Regional Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002	6,595	10,783	54,765	2,135	10,977

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Site visited on 7 May 2009.

**Determination Significance (Significance Threshold = 10%)**

	Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002 Regional Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 4 2010 Emissions	47.612	8.126	66.357	1.899	1.376
Proposed Action % of Regional Emissions	0.722%	0.075%	0.121%	0.089%	0.013%

Air Quality Emissions from Proposed Action						
	NO <sub>x</sub> (ton)	VOC (ton)	CO (ton)	SO <sub>2</sub> (ton)	PM <sub>10</sub> (ton)	CO <sub>2</sub> (metric ton)
Alternative 5 Combustion	5.111	1.333	7.294	0.227	0.601	675.66
Alternative 5 Commuter	0.020	0.030	0.000	0.000	0.000	7.69
TOTAL ALTERNATIVE 5	5.131	1.363	7.294	0.227	0.601	683.35

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

**Lanier and Lowndes Counties Georgia**

Year	Regional Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002	6,595	10,783	54,765	2,135	10,977

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Site visited on 7 May 2009.

**Determination Significance (Significance Threshold = 10%)**

	Point and Area Sources Combined				
	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)
2002 Regional Emissions	6,595	10,783	54,765	2,135	10,977
Alternative 5 2010 Emissions	5.131	1.363	7.294	0.227	0.601
Proposed Action % of Regional Emissions	0.078%	0.013%	0.013%	0.011%	0.005%

**Construction Combustion Emissions for Alternative 1 - Concentration of Surface Water within Wetland Complex with Multiple Parallel Ditches**  
Combustion Emissions of VOC, NO<sub>x</sub>, SO<sub>2</sub>, CO and PM<sub>10</sub> Due to Earthmoving

Includes:

	Estimated Volume	Length (ft)	Width (ft)	Depth (ft)	
1 Ditches	3,330,000 ft <sup>3</sup>	18,500	60	3	assumed
2 French Drains	45,000 ft <sup>3</sup>	5,000	3	3	assumed
3 Culverts	0 ft <sup>3</sup>				assumed existing
4 Dredging	0 ft <sup>3</sup>				
5 Fill	0 ft <sup>3</sup>				

Note: The length was taken from sketches provided in the DOPAA, the width and depth for all culverts and French drains was assumed.

	Operation					
	Dredging	Fill	Ditches	French Drain	Culvert	Land Clearing
Backhoe	X		X	X	X	
Loader	X					X
Haul Truck	X	X				X
Bulldozer		X	X	X	X	

The table above lists the equipment types assumed for each operation and where possible 1 piece of equipment, i.e. one haul truck, will be used for multiple operations.

Total Dredging Area	0 ft <sup>2</sup>	
Total Fill Area	0 ft <sup>2</sup>	
Total Ditch Area	1,110,000 ft <sup>2</sup>	
Total French Drain Area	15,000 ft <sup>2</sup>	
Total Culvert Area	0 ft <sup>2</sup>	
Total Clear Area	1,125,000 ft <sup>2</sup>	
Construction Duration:	0.5 year(s)	
Annual Construction Activity:	130 days/yr	assumes 5 days per week for 6 months construction schedule

#### Emission Factors Used for Construction Equipment

Equipment	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
Backhoe	4.02	0.65	5.36	0.16	0.12	1360.10
Bulldozer	22.61	3.66	30.14	0.90	0.68	1456.90
Loader	4.02	0.65	5.36	0.16	0.12	1360.10
Haul Truck	20.89	3.60	30.62	0.84	0.58	2342.98

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Note: Emission factors are taken from Table 3-2 (SMAQMD 2004). Assumptions regarding the type and number of equipment are from Table 3-1 (SMAQMD 2004) unless otherwise noted.

- The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor is assumed to be approximately 0.04 times the NO<sub>x</sub> emission factor for all equipment.

#### Summary of Input Parameters

Source	Equipment Multiplier*	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days
Dredging	0	0	0.000	0
Fill	0	0	0.000	0
Ditches	3	1,110,000	25.482	130
French Drains	1	15,000	0.344	130
Culverts	0	0	0.000	0
Clearing	3	1,125,000	25.826	130

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project  
NOTE: Total construction duration assumed to be five days per week for a period of 6 months.

Operation	Backhoe	Bulldozer	Loader	Haul Truck	Total Pieces of Equipment
Dredging	3	3	3	3	12
Fill					
Ditches					
French Drains					
Culverts					
Clearing					



**Total Alternative 1 Emissions by Activity (lbs)**

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Backhoe	2,090.40	338.00	2,787.20	83.62	62.40	707,252.00
Bulldozer	11,757.20	1,903.20	15,672.80	470.29	353.60	757,588.00
Loader	1,567.80	253.50	2,090.40	62.71	46.80	530,439.00
Haul Truck	8,147.10	1,404.00	11,941.80	325.88	226.20	913,762.20
<b>Total Emissions (lbs):</b>	<b>23,562.50</b>	<b>3,898.70</b>	<b>32,492.20</b>	<b>942.50</b>	<b>689.00</b>	<b>2,909,041.20</b>

Example Calculation

NO<sub>x</sub> emissions from the backhoe (lb/yr) = (backhoe NO<sub>x</sub> EF (lb/day) X dredging equipment multiplier X dredging total days (days/yr)) + (backhoe NO<sub>x</sub> EF (lb/day) X ditches equipment multiplier X ditches total days (days/yr)) + (backhoe NO<sub>x</sub> EF (lb/day) X french drain equipment multiplier X french drain total days (days/yr)) + (backhoe NO<sub>x</sub> EF (lb/day) X culverts equipment multiplier X culverts total days (days/yr))

**Results: Total Alternative 1 2010 Emissions**

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Total Project Emissions (lbs)	23,562.50	3,898.70	32,492.20	942.50	689.00	2,909,041.20
Total Project Emissions (tons)	11.78	1.95	16.25	0.47	0.34	1,319.53

Note: CO<sub>2</sub> emissions are in metric tons

### Construction Commuter Emissions

Assume 13 workers (1 for each piece of equipment and 1 foreman), 2 trips per day.

Total Trips

26

### Construction Trip Emissions for Year 2010

Trips	Year 2010 Emission Factors			
	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
1	0.05	0.03	0.0004	13.04
10	0.46	0.31	0.004	130.43
100	4.64	3.08	0.04	1,304.27
1000	46.4	30.8	0.4	13,042.67
10000	464	308	4	130,426.67

1. Emission Factors from Table 3.7, Guide to Air Quality Assessment, SMAQMD, 2004

2. The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.  
miles

4. It is assumed that the average vehicle will produce 19.564 pounds of CO<sub>2</sub> per gallon of gas used.  
(<http://www.eia.doe.gov/oiaf/1605/coefficients.html>)

5. It is assumed that the average vehicle fuel economy is 15 miles per gallon of fuel.

6. Example calculation for CO<sub>2</sub> emission factor for one trip:

(19.564 lb CO<sub>2</sub>/gal) x (1 gal/ 15 miles) x (10 miles/ trip) x (1 trip/ day) = 13.04 lb CO<sub>2</sub>/day

Interpolate to estimate the emission factors for 26 trips.

Trips	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
26	1.21	0.80	0.0104	339.1067

### Total Emissions

Days	VOC (lb/yr)	NO <sub>x</sub> (lb/yr)	PM <sub>10</sub> (lb/yr)	CO <sub>2</sub> (lb/yr)
130	157.3	104.0	1.4	44,083.87

### Construction Combustion Emissions for Alternative 2 - Complete Filling of Wetland Complex

Combustion Emissions of VOC, NO<sub>x</sub>, SO<sub>2</sub>, CO and PM<sub>10</sub> Due to Earthmoving

Includes:

	Estimated Volume	Length (ft)	Width (ft)	Depth (ft)	
1 Ditches	3,330,000 ft <sup>3</sup>	18,500	60	3	assumed
2 French Drains	45,000 ft <sup>3</sup>	5,000	3	3	assumed
3 Culverts	0 ft <sup>3</sup>				Assumed existing
4 Dredging	0 ft <sup>3</sup>				
5 Fill	15,681,600 ft <sup>3</sup>	120 acres		3	assumed

Note: The length was taken from sketches provided in the DOPAA, the width and depth for all culverts and French drains was assumed.

	Operation					
	Dredging	Fill	Ditches	French Drain	Culvert	Land Clearing
Backhoe	X		X	X	X	
Loader	X					X
Haul Truck	X	X				X
Bulldozer		X	X	X	X	

The table above lists the equipment types assumed for each operation and where possible 1 piece of equipment, i.e. one haul truck, will be used for multiple operations.

Total Dredging Area	0 ft <sup>2</sup>	
Total Fill Area	5,227,200 ft <sup>2</sup>	
Total Ditch Area	1,110,000 ft <sup>2</sup>	
Total French Drain Area	15,000 ft <sup>2</sup>	
Total Culvert Area	0 ft <sup>2</sup>	
Total Clear Area	1,125,000 ft <sup>2</sup>	
Construction Duration:	0.5 year(s)	
Annual Construction Activity:	130 days/yr	assumes 5 days per week for 6 months construction schedule

## Emission Factors Used for Construction Equipment

Equipment	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
Backhoe	4.02	0.65	5.36	0.16	0.12	1360.10
Bulldozer	22.61	3.66	30.14	0.90	0.68	1456.90
Loader	4.02	0.65	5.36	0.16	0.12	1360.10
Haul Truck	20.89	3.60	30.62	0.84	0.58	2342.98

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Note: Emission factors are taken from Table 3-2 (SMAQMD 2004). Assumptions regarding the type and number of equipment are from Table 3-1 (SMAQMD 2004) unless otherwise noted.

- The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor is assumed to be approximately 0.04 times the NO<sub>x</sub> emission factor for all equipment.

## Summary of Input Parameters

Source	Equipment Multiplier*	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days
Dredging	0	0	0.0	0
Fill	12	5,227,200	120.0	130
Ditches	3	1,110,000	25.5	130
French Drains	1	15,000	0.3	130
Culverts	0	0	0.0	0
Clearing	3	1,125,000	25.826	130

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project  
NOTE: Total construction duration assumed to be five days per week for a period of 6 months.

Operation	Backhoe	Bulldozer	Loader	Haul Truck	Total Pieces of Equipment
Dredging	12	3	12	12	39
Fill					
Ditches					
French Drains					
Culverts					
Clearing					

### Total Alternative 2 Emissions by Activity (lbs)

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Backhoe	2,090.40	338.00	2,787.20	83.62	62.40	707,252.00
Bulldozer	47,028.80	7,612.80	62,691.20	1,881.15	1,414.40	3,030,352.00
Loader	1,567.80	253.50	2,090.40	62.71	46.80	530,439.00
Haul Truck	40,735.50	7,020.00	59,709.00	1,629.42	1,131.00	4,568,811.00
<b>Total Emissions (lbs):</b>	<b>91,422.50</b>	<b>15,224.30</b>	<b>127,277.80</b>	<b>3,656.90</b>	<b>2,654.60</b>	<b>8,836,854.00</b>

### Results: Total Alternative 2 2010 Emissions

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Total Project Emissions (lbs)	91,422.50	15,224.30	127,277.80	3,656.90	2,654.60	8,836,854.00
Total Project Emissions (tons)	45.71	7.61	63.64	1.83	1.33	4,008.37

Note: CO<sub>2</sub> emissions are in metric tons



### Construction Commuter Emissions

Assume 40 workers (1 for each piece of equipment and 1 foreman) 2 trips per day.

Total Trips  
80

### Construction Trip Emissions for Year 2010

Trips	Year 2010 Emission Factors			
	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
1	0.05	0.03	0.0004	13.04
10	0.46	0.31	0.004	130.43
100	4.64	3.08	0.04	1,304.27
1000	46.4	30.8	0.4	13,042.67
10000	464	308	4	130,426.67

1. Emission Factors from Table 3.7, Guide to Air Quality Assessment, SMAQMD, 2004
2. The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.  
miles
4. It is assumed that the average vehicle will produce 19.564 pounds of CO<sub>2</sub> per gallon of gas used.  
(<http://www.eia.doe.gov/oiaf/1605/coefficients.html>)
5. It is assumed that the average vehicle fuel economy is 15 miles per gallon of fuel.
6. Example calculation for CO<sub>2</sub> emission factor for one trip:  
(19.564 lb CO<sub>2</sub>/gal) x (1 gal/ 15 miles) x (10 miles/ trip) x (1 trip/ day) = 13.04 lb CO<sub>2</sub>/day

Interpolate to estimate the emission factors for 80 trips.

Trips	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
80	3.72	24.82	0.0320	1043.4107

### Total Emissions

Days	VOC (lb/yr)	NO <sub>x</sub> (lb/yr)	PM <sub>10</sub> (lb/yr)	CO <sub>2</sub> (lb/yr)
130	483.0	3227.1	4.2	135,643.39

### Construction Combustion Emissions for Alternative 3 - Dredging of Wetlands to a Create Lake

Combustion Emissions of VOC, NO<sub>x</sub>, SO<sub>2</sub>, CO and PM<sub>10</sub> Due to Earthmoving

Includes:

	Estimated Volume	Length (ft)	Width (ft)	Depth (ft)	
1 Ditches	0 ft <sup>3</sup>				
2 French Drains	45,000 ft <sup>3</sup>	5,000	3	3	Assumed
3 Culverts	0 ft <sup>3</sup>				Assumed existing
4 Dredging	39,029,760 ft <sup>3</sup>	112 acres		8	
5 Fill	14,636,160 ft <sup>3</sup>	112 acres		3	Assumed

Note: The length was taken from sketches provided in the DOPAA, the width and depth for all culverts and French drains was assumed.

	Operation					
	Dredging	Fill	Ditches	French Drain	Culvert	Land Clearing
Backhoe	X		X	X	X	
Loader	X					X
Haul Truck	X	X				X
Bulldozer		X	X	X	X	

The table above lists the equipment types assumed for each operation and where possible 1 piece of equipment, i.e. one haul truck, will be used for multiple operations.

Total Dredging Area	4,878,720 ft <sup>2</sup>	
Total Fill Area	4,878,720 ft <sup>2</sup>	
Total Ditch Area	0 ft <sup>2</sup>	
Total French Drain Area	15,000 ft <sup>2</sup>	
Total Culvert Area	0 ft <sup>2</sup>	
Total Clear Area	15,000 ft <sup>2</sup>	
Construction Duration:	0.5 year(s)	
Annual Construction Activity:	130 days/yr	assumes 5 days per week for 6 months construction schedule

## Emission Factors Used for Construction Equipment

Equipment	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
Backhoe	4.02	0.65	5.36	0.16	0.12	1360.10
Bulldozer	22.61	3.66	30.14	0.90	0.68	1456.90
Loader	4.02	0.65	5.36	0.16	0.12	1360.10
Haul Truck	20.89	3.60	30.62	0.84	0.58	2342.98

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Note: Emission factors are taken from Table 3-2 (SMAQMD 2004). Assumptions regarding the type and number of equipment are from Table 3-1 (SMAQMD 2004) unless otherwise noted.

- The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor is assumed to be approximately 0.04 times the NO<sub>x</sub> emission factor for all equipment.

## Summary of Input Parameters

Source	Equipment Multiplier*	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days
Dredging	12	4,878,720	112.0	130
Fill	12	4,878,720	112.0	130
Ditches	0	0	0.0	0
French Drains	1	15,000	0.3	130
Culverts	0	0	0.0	0
Clearing	1	15,000	0.344	130

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project  
NOTE: Total construction duration assumed to be five days per week for a period of 6 months.

Operation	Backhoe	Bulldozer	Loader	Haul Truck	Total Pieces of Equipment
Dredging	12	12	12	12	48
Fill					
Ditches					
French Drains					
Culverts					
Clearing					

### Total Alternative 3 Emissions by Activity (lbs)

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Backhoe	6,793.80	1,098.50	9,058.40	271.75	202.80	2,298,569.00
Bulldozer	38,210.90	6,185.40	50,936.60	1,528.44	1,149.20	2,462,161.00
Loader	6,793.80	1,098.50	9,058.40	271.75	202.80	2,298,569.00
Haul Truck	67,892.50	11,700.00	99,515.00	2,715.70	1,885.00	7,614,685.00
<b>Total Emissions (lbs):</b>	<b>119,691.00</b>	<b>20,082.40</b>	<b>168,568.40</b>	<b>4,787.64</b>	<b>3,439.80</b>	<b>14,673,984.00</b>

### Results: Total Alternative 3 Annual Emissions

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Total Project Emissions (lbs)	119,691.00	20,082.40	168,568.40	4,787.64	3,439.80	14,673,984.00
Total Project Emissions (tons)	59.85	10.04	84.28	2.39	1.72	6,656.08

Note: CO<sub>2</sub> emissions are in metric tons

### Construction Commuter Emissions

Assume 49 workers (1 for each piece of equipment and 1 foreman) 2 trips per day.

Total Trips  
98

### Construction Trip Emissions for Year 2010

Trips	Year 2010 Emission Factors			
	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
1	0.05	0.03	0.0004	13.04
10	0.46	0.31	0.004	130.43
100	4.64	3.08	0.04	1,304.27
1000	46.4	30.8	0.4	13,042.67
10000	464	308	4	130,426.67

1. Emission Factors from Table 3.7, Guide to Air Quality Assessment, SMAQMD, 2004
2. The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.  
miles
4. It is assumed that the average vehicle will produce 19.564 pounds of CO<sub>2</sub> per gallon of gas used.  
(<http://www.eia.doe.gov/oiaf/1605/coefficients.html>)
5. It is assumed that the average vehicle fuel economy is 15 miles per gallon of fuel.
6. Example calculation for CO<sub>2</sub> emission factor for one trip:  
(19.564 lb CO<sub>2</sub>/gal) x (1 gal/ 15 miles) x (10 miles/ trip) x (1 trip/ day) = 13.04 lb CO<sub>2</sub>/day

Interpolate to estimate the emission factors for 98 trips.

Trips	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
98	4.55	3.02	0.0392	1278.1787

### Total Emissions

Days	VOC (lb/yr)	NO <sub>x</sub> (lb/yr)	PM <sub>10</sub> (lb/yr)	CO <sub>2</sub> (lb/yr)
130	591.6	392.3	5.1	166,163.23



# **Construction Combustion Emissions for Alternative 4 - Partial Dredge and Fill**

Combustion Emissions of VOC, NO<sub>x</sub>, SO<sub>2</sub>, CO and PM<sub>10</sub> Due to Earthmoving

Includes:

	Estimated Volume	Length (ft)	Width (ft)	Depth (ft)	
1 Ditches	0 ft <sup>3</sup>				
2 French Drains	45,000 ft <sup>3</sup>	5,000	3	3	Assumed
3 Culverts	14,400 ft <sup>3</sup>	1,600	3	3	Assumed
4 Dredging	10,454,400 ft <sup>3</sup>	30 acres		8	
5 Fill	22,651,200 ft <sup>3</sup>	130 acres		4	Assumed

Note: The length was taken from sketches provided in the DOPAA, the width and depth for all culverts and French drains was assumed.

	Operation					
	Dredging	Fill	Ditches	French Drain	Culvert	Land Clearing
Backhoe	X		X	X	X	
Loader	X					X
Haul Truck	X	X				X
Bulldozer		X	X	X	X	

The table above lists the equipment types assumed for each operation and where possible 1 piece of equipment, i.e. one haul truck, will be used for multiple operations.

Total Dredging Area	1,306,800 ft <sup>2</sup>	
Total Fill Area	5,662,800 ft <sup>2</sup>	
Total Ditch Area	0 ft <sup>2</sup>	
Total French Drain Area	15,000 ft <sup>2</sup>	
Total Culvert Area	4,800 ft <sup>2</sup>	
Total Clear Area	19,800 ft <sup>2</sup>	
Construction Duration:	0.5 year(s)	
Annual Construction Activity:	130 days/yr	assumes 5 days per week for 6 months construction schedule

## Emission Factors Used for Construction Equipment

Equipment	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
Backhoe	4.02	0.65	5.36	0.16	0.12	1360.10
Bulldozer	22.61	3.66	30.14	0.90	0.68	1456.90
Loader	4.02	0.65	5.36	0.16	0.12	1360.10
Haul Truck	20.89	3.60	30.62	0.84	0.58	2342.98

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Note: Emission factors are taken from Table 3-2 (SMAQMD 2004). Assumptions regarding the type and number of equipment are from Table 3-1 (SMAQMD 2004) unless otherwise noted.

- The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor is assumed to be approximately 0.04 times the NO<sub>x</sub> emission factor for all equipment.

## Summary of Input Parameters

Source	Equipment Multiplier*	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days
Dredging	3	1,306,800	30.0	130
Fill	13	5,662,800	130.0	130
Ditches	0	0	0.0	0
French Drains	1	15,000	0.3	130
Culverts	1	4,800	0.1	130
Clearing	1	19,800	0.455	130

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project  
NOTE: Total construction duration assumed to be five days per week for a period of 6 months.

Operation	Backhoe	Bulldozer	Loader	Haul Truck	Total Pieces of Equipment
Dredging	3	13	3	13	32
Fill					
Ditches					
French Drains					
Culverts					
Clearing					

#### Total Alternative 4 Emissions by Activity (lbs)

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Backhoe	2,613.00	422.50	3,484.00	104.52	78.00	884,065.00
Bulldozer	44,089.50	7,137.00	58,773.00	1,763.58	1,326.00	2,840,955.00
Loader	2,090.40	338.00	2,787.20	83.62	62.40	707,252.00
Haul Truck	46,166.90	7,956.00	67,670.20	1,846.68	1,281.80	5,177,985.80
<b>Total Emissions (lbs):</b>	<b>94,959.80</b>	<b>15,853.50</b>	<b>132,714.40</b>	<b>3,798.39</b>	<b>2,748.20</b>	<b>9,610,257.80</b>

#### Results: Total Alternative 4 - 2010 Emissions

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Total Project Emissions (lbs)	94,959.80	15,853.50	132,714.40	3,798.39	2,748.20	9,610,257.80
Total Project Emissions (tons)	47.48	7.93	66.36	1.90	1.37	4,359.18

Note: CO<sub>2</sub> emissions are in metric tons

# **Construction Commuter Emissions**

Assume 33 workers (1 for each piece of equipment and 1 foreman) 2 trips per day.

Total Trips

66

## Construction Trip Emissions for Year 2010

Trips	Year 2010 Emission Factors			
	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
1	0.05	0.03	0.0004	13.04
10	0.46	0.31	0.004	130.43
100	4.64	3.08	0.04	1,304.27
1000	46.4	30.8	0.4	13,042.67
10000	464	308	4	130,426.67

1. Emission Factors from Table 3.7, Guide to Air Quality Assessment, SMAQMD, 2004

2. The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For purposes of this worksheet ROG = VOC.  
miles

4. It is assumed that the average vehicle will produce 19.564 pounds of CO<sub>2</sub> per gallon of gas used.  
(<http://www.eia.doe.gov/oiaf/1605/coefficients.html>)

5. It is assumed that the average vehicle fuel economy is 15 miles per gallon of fuel.

6. Example calculation for CO<sub>2</sub> emission factor for one trip:

$$(19.564 \text{ lb CO}_2/\text{gal}) \times (1 \text{ gal}/15 \text{ miles}) \times (10 \text{ miles}/\text{trip}) \times (1 \text{ trip}/\text{day}) = 13.04 \text{ lb CO}_2/\text{day}$$

Interpolate to estimate the emission factors for 66 trips.

Trips	VOC (lb/day)	NO <sub>x</sub> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
66	3.07	2.03	0.0264	860.8134

## Total Emissions

Days	VOC (lb/yr)	NO <sub>x</sub> (lb/yr)	PM <sub>10</sub> (lb/yr)	CO <sub>2</sub> (lb/yr)
130	398.6	264.2	3.4	111,905.74

Construction Combustion Emissions for Alternative 5 - Vegetation Management

Combustion Emissions of VOC, NO<sub>x</sub>, SO<sub>2</sub>, CO and PM<sub>10</sub> Due to Earthmoving

Includes:

1 Roads (Assume 2 roads 3,000 ft by 6 ft and 3 roads 2,000 ft by 6	Estimated Volume 144,000 ft <sup>3</sup>	Length (ft) 12,000	Width (ft) 6	Depth (ft) 2	Assumed
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Road construction will occur in a wetland it is assumed that a water truck is not required.  
ATV will be used to harass birds and wildlife 3.5 trips per day for 5 days per week.

	Operation	
	Roads	Land Clearing
Grader	X	
Loader		X
Haul Truck	X	X
Bulldozer	X	

The table above lists the equipment types assumed for each operation and where possible 1 piece of equipment, i.e. one haul truck, will be used for multiple operations.

Total Road Area	72,000 ft <sup>2</sup>	
Total Clear Area	72,000 ft <sup>2</sup>	
Construction Duration:	0.50 year(s)	
Annual Construction Activity:	130 days/yr	assumes 5 days per week for 6 months construction schedule



## Emission Factors Used for Construction Equipment

Equipment	NO <sub>x</sub> (lb/day)	VOC <sup>b</sup> (lb/day)	CO (lb/day)	SO <sub>2</sub> <sup>c</sup> (lb/day)	PM <sub>10</sub> (lb/day)	CO <sub>2</sub> (lb/day)
Grader	10.22	1.76	14.98	0.41	0.28	1141.65
Bulldozer	22.61	3.66	30.14	0.90	0.68	1456.90
Loader	4.02	0.65	5.36	0.16	0.12	1360.10
ATV <sup>d</sup>		1.03	0.07	0.05	1.00	401.93
Haul Truck	20.89	3.60	30.62	0.84	0.58	2342.98

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Note: Emission factors are taken from Table 3-2 (SMAQMD 2004). Assumptions regarding the type and number of equipment are from Table 3-1 (SMAQMD 2004) unless otherwise noted.

- The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.
- The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.
- The SMAQMD 2004 reference does not provide SO<sub>2</sub> emission factors. For this worksheet, SO<sub>2</sub> emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO<sub>2</sub> factor is assumed to be approximately 0.04 times the NO<sub>x</sub> emission factor for all equipment.
- The emission factors for ATV were taken from NONROAD2005.

## Summary of Input Parameters

Source	Equipment Multiplier*	Total Area (ft <sup>2</sup> )	Total Area (acres)	Total Days
Roads	1	72,000	1.7	130
Clearing	1	72,000	1.7	130

\*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project  
NOTE: Total construction duration assumed to be five days per week for a period of 6 months.

Operation	Grader	Bulldozer	Loader	Haul Truck	Total Pieces of Equipment
Roads	1	1	1	1	4
Clearing					

### Total Alternative 5 Emissions by Activity (lbs)

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Grader	1,328.60	228.80	1,947.40	53.14	36.40	148,414.13
Bulldozer	2,939.30	475.80	3,918.20	117.57	88.40	189,397.00
Loader	522.60	84.50	696.80	20.90	15.60	176,813.00
ATV		940.94	63.70	45.50	910.00	365,756.30
Haul Truck	5,431.40	936.00	7,961.20	217.26	150.80	609,174.80
<b>Total Emissions (lbs):</b>	<b>10,221.90</b>	<b>2,666.04</b>	<b>14,587.30</b>	<b>454.38</b>	<b>1,201.20</b>	<b>1,489,555.23</b>

### Results: Total Alternative 5 Annual Emissions

	NO <sub>x</sub>	VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	CO <sub>2</sub>
Total Project Emissions (lbs)	10,221.90	2,666.04	14,587.30	454.38	1,201.20	1,489,555.23
Total Project Emissions (tons)	5.11	1.33	7.29	0.23	0.60	675.66

Note: CO<sub>2</sub> emissions are in metric tons



337.8	106.5	36.6	28.7	119.4	176.6	4513.3	507.7	882.2	181.9	85.9	758.8
337.8	106.5	36.6	28.7	119.4	176.6	5138.7	553	1061.1	230.5	94.1	901.7

			Point Source Emissions					Nonpoint+Mobile Source Emissions						
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	GA	Lanier Co	0	0	0	0	0	0	6,255	452	1,789	486	81.3	1,429
2	GA	Co	3,378	1,065	366	287	1,194	1,766	45,133	5,077	8,822	1,819	859	7,588
Grand Total			3,378	1,065	366	287	1,194	1,766	51,387	5,530	10,611	2,305	941	9,017

<http://iaspub.epa.gov/airsdata/adnet.tier?geotype=co&geocode=13173+13185&geoinfo=co%7E13173+13185%7ELanier+Co%2C+Lowndes+Co%2C+Georgia&pol=CO+NOX+SO2+VOC+PM25+PM10&year=2002&fld=state&fld=county&rpp=25>

7-May-09

#### Emissions by Category Report - Criteria Air Pollutants

**Geographic Area:** Lanier Co, Lowndes Co, GA

**Pollutant:** Carbon Monoxide, Nitrogen Oxides, Particles < 10 micrometers diameter, Particles < 2.5 micrometers diameter, Sulfur Dioxide, Volatile Organic Compounds

**Year:** 2002

Emissions In Tons Per Year

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## **APPENDIX F**

### **MITIGATION REQUIREMENTS AND COST ESTIMATES FOR ALTERNATIVES**



## Regulatory and Mitigation Requirements

Section 404 of the Clean Water Act (CWA) prohibits the discharge of dredged or fill material into wetlands, streams, and other waters of the United States unless a permit is issued by the U.S. Army Corps of Engineers (USACE) or an approved state. When there is a proposed discharge, all appropriate and practicable steps must first be taken to avoid and minimize impacts on aquatic resources. For unavoidable impacts, compensatory mitigation is required to replace the loss of wetland, stream, or other aquatic resource functions. The USACE is responsible for determining the appropriate form and amount of compensatory mitigation required. Methods of providing compensatory mitigation include aquatic resource restoration, establishment, enhancement, and, in certain circumstances, preservation (USACE Savannah District 2008a).

Moody AFB would be required to obtain a Section 404 Standard Individual Permit from USACE (USACE Savannah District 2008a), Savannah District as well as a CWA Section 401 Water Quality Certification from the State of Georgia. Section 401 of the CWA requires state agencies to evaluate projects that will result in the discharge of dredged or fill material into waters of the United States to determine whether the discharge will violate the state's water quality standards. A Section 401 Water Quality Certification is required for activities that require Federal permits such as a Section 404 permit. Georgia operates Section 401 Water Quality Certification in conjunction with the USACE via a Memorandum of Agreement that provides for a joint application process. A copy of the application for a Section 404 permit will automatically be sent by USACE to the Georgia Environmental Protection Division for State Section 401 Water Quality Certification (Georgia DNR CRD undated).

Moody AFB would need to mitigate the loss of wetlands due to the alternatives for implementing the Proposed Action through one of two ways: permittee-responsible mitigation or mitigation banking. The USACE Savannah District determines whether to use a functional assessment method or acreage surrogates for determining mitigation and for describing authorized impacts on a case-by-case basis (USACE 2002). If the Savannah District determines that Moody AFB can use acres as the standard measure for determining impacts and required mitigation for wetlands, Moody AFB could be required to restore or establish wetlands on the installation or within the watershed in a 1.5 to 1 ratio (i.e., 1.5 acres of wetland would need to be created for every 1 acre lost). This value is based on the "Lost Kind" of functional value that the wetland provided. The south EOR and southeastern corner wetlands are designated as "Kind B," which are non-riverine forested wetlands or freshwater areas adjacent to tidal areas and are assigned a 1.5 impact factor (USACE Savannah District 2008b).

A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or preserved. This resource area is then set aside to compensate for future impacts on aquatic resources resulting from permitted activities. The value of a bank is determined by quantifying the aquatic resource functions restored, established, enhanced, or preserved in terms of "credits." Permittees, upon approval of regulatory agencies, can acquire these credits to meet their requirements for compensatory mitigation (USACE Savannah District 2008c). Two mitigation bank service areas cover the ROI wetlands, including the Cherry Creek Service Area and Cecil Bay/Heart Pine Pond Service Area (USACE Savannah District 2008d). The Cherry Creek Mitigation Bank, owned by Environmental Consulting and Design, Inc. (USACE Savannah District 2008c), had 124 credits remaining in bank as of December 2008. The cost per mitigation credit is \$1,800 (Garcia 2008). Cecil Bay/Heart Pine Pond Mitigation bank, owned by Williams Investment Company (USACE Savannah District 2008c), had approximately 6,000 credits available as of December 2008. The cost per mitigation credit is approximately \$3,000, or much lower when bought in large quantities (Williams 2008).

The following wetland/open water mitigation worksheets developed for each alternative were adapted from the blank worksheets provided on the USACE Savannah District's Compensatory Mitigation website (USACE Savannah District 2008e). These worksheets were developed for general environmental consequences and cost analyses only. The USACE Savannah District would be responsible for determining the appropriate form and amount of compensatory mitigation required for a proposed action.

## Alternative 1

### ADVERSE IMPACT FACTORS

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

### REQUIRED MITIGATION CREDITS WORKSHEET

	Minimum <sup>a</sup>		Maximum <sup>a</sup>			
Factor	Area 1		Area 1			
Dominant Effect	1.8		1.8			
Duration of Effect	2.0		2.0			
Existing Condition	0.5		1.0			
Lost Kind	1.5		1.5			
Preventability	1.0		1.0			
Rarity Ranking	0.1		0.1			
Sum of r Factors	R <sub>1</sub> = 6.9		R <sub>1</sub> = 7.4			
Impacted Area	AA <sub>1</sub> = 28.75 <sup>b</sup>		AA <sub>1</sub> = 28.75 <sup>b</sup>			
R × AA =	198.38		212.75			

**Total Required Credits =  $\Sigma (R \times AA) =$**

**Minimum: 198.38**

**Maximum: 212.75**

<sup>a</sup> A range of required mitigation credits is given (minimum and maximum) due to what USACE Savannah District might determine as the "Existing Condition" of the existing wetlands within the south EOR and southeast corner wetlands. The minimum value of required credits is calculated with an Existing Condition factor of 0.5 and the maximum value is calculated with an Existing Condition factor of 1.0. See the Compensatory Mitigation Definitions of Factors section following these worksheets for definitions of the Adverse Impact Factors.

<sup>b</sup> Impacted area is a rough estimate based on preliminary design.



## Alternative 2

### ADVERSE IMPACT FACTORS

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

### REQUIRED MITIGATION CREDITS WORKSHEET

	Minimum		Maximum			
Factor	Area 1		Area 1			
Dominant Effect	2.0		2.0			
Duration of Effect	2.0		2.0			
Existing Condition	0.5		1.0			
Lost Kind	1.5		1.5			
Preventability	1.0		1.0			
Rarity Ranking	0.1		0.1			
Sum of r Factors	$R_1 = 7.1$		$R_1 = 7.6$			
Impacted Area	$AA_1 = 90.65$		$AA_1 = 90.65$			
$R \times AA =$	643.62		688.94			

**Total Required Credits =  $\Sigma (R \times AA) =$**

**Minimum: 643.62**

**Maximum: 688.94**

\* A range of required mitigation credits is given (minimum and maximum) due to what USACE Savannah District might determine as the "Existing Condition" of the existing wetlands within the south EOR and southeast corner wetlands. The minimum value of required credits is calculated with an Existing Condition factor of 0.5 and the maximum value is calculated with an Existing Condition factor of 1.0. See the Compensatory Mitigation Definitions of Factors section following these worksheets for definitions of the Adverse Impact Factors.

### Alternative 3

#### ADVERSE IMPACT FACTORS

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

#### REQUIRED MITIGATION CREDITS WORKSHEET

	Minimum			Maximum		
Factor	Area 1	Area 2		Area 1	Area 2	
Dominant Effect	1.8	2.0		1.8	2.0	
Duration of Effect	2.0	2.0		2.0	2.0	
Existing Condition	0.5	0.5		1.0	1.0	
Lost Kind	1.5	1.5		1.5	1.5	
Preventability	1.0	1.0		1.0	1.0	
Rarity Ranking	0.1	0.1		0.1	0.1	
Sum of r Factors	R <sub>1</sub> = 6.9	R <sub>2</sub> = 7.1		R <sub>1</sub> = 7.4	R <sub>2</sub> = 7.6	
Impacted Area	AA <sub>1</sub> = 81.78	AA <sub>2</sub> = 8.87		AA <sub>1</sub> = 81.78	AA <sub>2</sub> = 8.87	
R × AA =	564.28	62.98		605.17	67.41	

**Total Required Credits =  $\sum (R \times AA) =$**

**Minimum: 627.26**

**Maximum: 672.58**

\* A range of required mitigation credits is given (minimum and maximum) due to what USACE Savannah District might determine as the “Existing Condition” of the existing wetlands within the south EOR and southeast corner wetlands. The minimum value of required credits is calculated with an Existing Condition factor of 0.5 and the maximum value is calculated with an Existing Condition factor of 1.0. See the Compensatory Mitigation Definitions of Factors section following these worksheets for definitions of the Adverse Impact Factors.

### Alternative 4

#### ADVERSE IMPACT FACTORS

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

#### REQUIRED MITIGATION CREDITS WORKSHEET

	Minimum			Maximum		
Factor	Area 1	Area 2		Area 1	Area 2	
Dominant Effect	2.0	1.8		2.0	1.8	
Duration of Effect	2.0	2.0		2.0	2.0	
Existing Condition	0.5	0.5		1.0	1.0	
Lost Kind	1.5	1.5		1.5	1.5	
Preventability	1.0	1.0		1.0	1.0	
Rarity Ranking	0.1	0.1		0.1	0.1	
Sum of r Factors	R <sub>1</sub> = 6.9	R <sub>2</sub> = 7.1		R <sub>1</sub> = 7.4	R <sub>2</sub> = 7.6	
Impacted Area	AA <sub>1</sub> = 60.65	AA <sub>2</sub> = 30.0		AA <sub>1</sub> = 60.65	AA <sub>2</sub> = 30.0	
R × AA =	418.49	213.00		460.94	222.0	

**Total Required Credits =  $\sum (R \times AA) =$**

**Minimum: 631.49**

**Maximum: 682.94**

\* A range of required mitigation credits is given (minimum and maximum) due to what USACE Savannah District might determine as the “Existing Condition” of the existing wetlands within the south EOR and southeast corner wetlands. The minimum value of required credits is calculated with an Existing Condition factor of 0.5 and the maximum value is calculated with an Existing Condition factor of 1.0. See the Compensatory Mitigation Definitions of Factors section following these worksheets for definitions of the Adverse Impact Factors.

## Alternative 5

### ADVERSE IMPACT FACTORS

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

### REQUIRED MITIGATION CREDITS WORKSHEET

	Minimum		Maximum			
Factor	Access Road		Access Road			
Dominant Effect	2.0		2.0			
Duration of Effect	2.0		2.0			
Existing Condition <sup>a</sup>	0.5		1.0			
Lost Kind	1.5		1.5			
Preventability	1.0		1.0			
Rarity Ranking	0.1		0.1			
Sum of r Factors	R <sub>1</sub> = 7.1		R <sub>1</sub> = 7.6			
Impacted Area <sup>b</sup>	AA <sub>1</sub> = 0.5		AA <sub>1</sub> = 0.5			
R × AA =	3.55		3.80			

**Total Required Credits =  $\Sigma (R \times AA) =$**

**Minimum: 3.55**

**Maximum: 3.80**

<sup>a</sup> A range of required mitigation credits is given (minimum and maximum) due to what USACE Savannah District might determine as the “Existing Condition” of the existing wetlands within the south EOR and southeastern corner wetlands. The minimum value of required credits is calculated with an Existing Condition factor of 0.5 and the maximum value is calculated with an Existing Condition factor of 1.0. See the Compensatory Mitigation Definitions of Factors section following these worksheets for definitions of the Adverse Impact Factors.

<sup>b</sup> Area based on assumed access road width of 15 feet and length of 1,600 feet.

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### Alternative 1 Cost Estimates

#### 1. Construction costs

Material	Unit	Unit Cost (\$)*	Qty.	Price (\$)	Notes
Clearing and Grubbing	S.Y.	0.10	153,000	15,300.00	
Silt Fence	L.F.	1.00	23,000	23,000.00	Downstream side of channel only
Hay Bails	EA.	90.00	114	10,260.00	Assume 1 hay bail revetment every 200'
Excavation	C.Y.	4.50	75,667	340,501.50	
Embankment (fill)	C.Y.	9.00	15,133	136,200.60	Assumed that there will be instances where channel depth will not be maintained without embankment. 20% of excavation qty. was used as estimate. Cost includes material and placement
Hydroseed	S.Y.	1.50	3,000	4,500.00	
Trench Excavation Protection	L.F.	1.00	4,500	4,500.00	
Graded and Washed Gravel Backfill	C.Y.	38.00	589	22,382.00	Assume minimum width is 12" plus pipe diameter. 12" HDPE Corrugated assumed. Added 2" for corrugation. Depth of fill is 12" height is 12". Material displacement and depth to grade neglected. +10% err
Filter Fabric	S.F.	1.00	14,137	14,137.00	
12" Corrugated HDPE	L.F.	15.00	4,950	74,250.00	+10% for waste
Mobilization		1%		8,285.60	
Bond		2%		16,736.90	
Contingency		20%		170,716.42	
				<b>797,413.25</b>	

Note:

\* Unit Cost includes all labor, materials, and equipment

## 2. Vegetation costs (titi and floating leaved aquatic vegetation)

### Titi

Mature titi shrubs are 10-15 feet wide

Plant titi in staggered rows, distance of 10 or 15-foot on-center (i.e., distance between centers of shrubs)

120 total acres of wetland in ROI – 30 acres in ditches = 90 acres for titi planting

15 feet on-center (o.c.):  $15' \times 15' = 225$  square feet (ft<sup>2</sup>)

10 feet o.c.:  $10' \times 10' = 100$  ft<sup>2</sup>

1 acre = 43,560 ft<sup>2</sup>

$43,560 \text{ ft}^2 / 225 \text{ ft}^2 = 194$  plants/acre @ 15 feet o.c.

$43,560 \text{ ft}^2 / 100 \text{ ft}^2 = 436$  plants/acre @ 10 feet o.c.

**Titi Wholesale and Installation Cost Estimates**

Plant Size	Cost		
	Wholesale	Installation	Total Cost
1 gallon, 10' o.c.	\$6.00	\$6.00	\$12.00
3 gallon, 15' o.c.	\$12.00	\$12.00	\$24.00
7 gallon, 15' o.c.	\$24.00	\$24.00	\$48.00

Note: o.c. = on-center

### Costs for Different Planting Options

	Plant Size		
	1 gallon	3 gallon	7 gallon
<b>Plant cost</b>	\$6	\$12	\$24
<b>Installation cost</b>	\$6	\$12	\$24
<b>Density</b>	10 feet o.c.	15 feet o.c.	15 feet o.c.
<b># / acre</b>	436	194	194
<b># / project (90 acres)</b>	39,240	17,460	17,460
<b>Total Cost</b>	\$470,880	\$419,040*	\$838,080

\* Assume this price used for planning purposes

#### Yellow pond lily (spatterdock)

Wholesale price: \$1.40 per plant

Assume 50,000 plants @ \$1.40 each: \$70,500

#### **3. Mitigation costs (from mitigation worksheet):**

198 to 213 credits @ \$1,800 per credit = \$356,400 to \$383,400

**TOTAL:** Approximately \$1.64 to \$1.67 million

## Alternative 2 Cost Estimates

### 1. Construction costs

Material	Unit	Unit Cost (\$)*	Qty.	Price (\$)	Notes
Clearing and Grubbing	S.Y.	0.10	581,000	58,100.00	
Silt Fence	L.F.	1.00	10,100	10,100.00	Reduced cost due to volume. Should be noted that material in this quantity may be hard to find. If this is considered, an area on site that can be mined would be ideal.
Embankment (fill)	C.Y.	7.00	348,100	2,436,700.00	
Hydroseed	S.Y.	1.00	580,800	580,800.00	
Trench Excavation Protection	L.F.	1.00	4,500	4,500.00	
Graded and Washed Gravel Backfill	C.Y.	38.00	589	22,382.00	
Filter Fabric	S.F.	1.00	14,137	14,137.00	
12" Corrugated HDPE	L.F.	15.00	4,950	74,250.00	
Mobilization		1%		29,747.04	
Bond		2%		60,089.02	
Contingency		20%		612,908.01	
				<b>3,957,165.92</b>	

Note:

\* Unit Cost includes all labor, materials, and equipment

### 2. Mitigation costs (from mitigation worksheet)

643 to 689 credits @ \$1,800 per credit: \$1,157,400 to \$1,240,200

**TOTAL:** Approximately \$5.11 to \$5.20 million

### Alternative 3 Cost Estimates

#### 1. Construction costs

Material	Unit	Unit Cost (\$)*	Qty.	Price (\$)	Notes
Clearing and Grubbing	S.Y.	0.10	451,000	45,100.00	
Silt Fence	L.F.	1.00	2,400	2,400.00	
Excavation	C.Y.	4.50	1,161,600	5,227,200.00	While assumption that a vertical wall will be used is erroneous, the reduction in volume assuming 3:1 slope is minimal to size of project. Vertical assumed.
Embankment (fill)	C.Y.	6.00	38,720	232,320.00	Material to be used from excavation. Placement assumed to use a haul road as opposed to crane.
Hydroseed	S.Y.	1.50	38,720	58,080.00	
Mobilization		1%		55,786.52	
Bond		2%		112,688.77	
Contingency		20%		1,149,425.46	
				<b>6,879,799.22</b>	

Note:

\* Unit Cost includes all labor, materials, and equipment

#### 2. Mitigation costs (from mitigation worksheet)

627 to 673 credits @\$1,800 per credit: \$1,128,600 to \$1,211,400

**TOTAL:** Approximately \$8.01 to \$8.09 million



#### Alternative 4 Cost Estimates

##### 1. Construction costs

Material	Unit	Unit Cost (\$)*	Qty.	Price (\$)
Clearing and Grubbing	S.Y.	0.10	581,000	58,100.00
Silt Fence	L.F.	1.00	7,920	7,920.00
Excavation	C.Y.	4.50	387,200	1,742,400.00
Embankment (fill)	C.Y.	9.00	435,600	3,920,400.00
Hydroseed	S.Y.	1.50	581,000	651,900.00
Trench Excavation Protection	L.F.	1.00	6,080	6,080.00
Graded and Washed Gravel Backfill	C.Y.	38.00	724	27,512.00
Filter Fabric	S.F.	1.00	19,100	19,100.00
12" Corrugated HDPE	L.F.	15.00	6,700	100,500.00
Mobilization		1%		67,535.12
Bond		2%		136,420.94
Contingency		20%		1,391,493.61
				<b>8,077,483.37</b>

Note:

\* Unit Cost includes all labor, materials, and equipment

##### 2. Mitigation costs (from mitigation worksheet)

631 to 683 credits @ \$1,800 per credit: \$1,135,800 to \$1,229,400

**TOTAL:** Approximately \$9.21 to \$9.31 million

### Alternative 5 Cost Estimates

#### 1. Construction costs

Material	Unit	Unit Cost (\$)*	Qty.	Price (\$)
Clearing and Grubbing	S.Y.	0.10	3,200	320.00
Silt Fence	L.F.	1.00	3,200	3,200.00
Embankment (fill)	C.Y.	9.00	7,800	70,200.00
12" Flexible Base	S.Y.	12.00	2,700	32,400.00
Geotextile	S.Y.	1.50	2,940	4,410.00
Mobilization		1%		1,105.30
Bond		2%		2,232.71
Contingency		20%		22,773.60
				<b>136,641.61</b>

Note: Access road dimensions are assumed to be 1,600 feet long by 15 feet wide

\* Unit Cost includes all labor, materials, and equipment

#### 2. Vegetation costs (titi)

Mature titi shrubs are 10-15 feet wide

Plant titi in staggered rows, distance of 10 or 15-foot o.c. (i.e., distance between centers of shrubs)

120 total acres of wetland in ROI for titi planting

15 feet o.c.:  $15' \times 15' = 225 \text{ ft}^2$

10 feet o.c.:  $10' \times 10' = 100 \text{ ft}^2$

$43,560 \text{ ft}^2 / 225 \text{ ft}^2 = 194 \text{ plants/acre @ 15 feet o.c.}$

$43,560 \text{ ft}^2 / 100 \text{ ft}^2 = 436 \text{ plants/acre @ 10 feet o.c.}$

### Titi Wholesale and Installation Cost Estimates

Plant Size	Cost		
	Wholesale	Installation	Total Cost
1 gallon, 10' o.c.	\$6.00	\$6.00	\$12.00
3 gallon, 15' o.c.	\$12.00	\$12.00	\$24.00
7 gallon, 15' o.c.	\$24.00	\$24.00	\$48.00

Note: o.c. = on-center

### Costs for Different Planting Options

	Plant Size		
	1 gallon	3 gallon	7 gallon
<b>Plant cost</b>	\$6	\$12	\$24
<b>Installation cost</b>	\$6	\$12	\$24
<b>Density</b>	10 feet o.c.	15 feet o.c.	15 feet o.c.
<b># / acre</b>	436	194	194
<b># / project (120 acres)</b>	52,320	23,280	23,280
<b>Total Cost</b>	\$627,840	\$558,720*	\$1,117,440

\* Assume this price used for planning purposes

### 3. Mitigation costs (from mitigation worksheet)

3.55 credits @ \$1,800 - \$3,000 per credit: \$6,390 - \$6,840

3.80 credits @ \$1,800 - \$3,000 per credit: \$10,650 - \$11,400

**TOTAL:** Approximately \$702,000 to \$707,000

**APPENDIX G**  
**MOODY AFB DEPREDATION PERMIT**







DEPARTMENT OF THE INTERIOR  
U.S. FISH AND WILDLIFE SERVICE

3-201  
(1/87)

## FEDERAL FISH AND WILDLIFE PERMIT

1 PERMITTEE

MOODY AIR FORCE BASE  
5107 AUSTIN ELLIPSE  
23RD WG/SE  
VALDOSTA, GA 31699  
U.S.A.

2 AUTHORITY-STATUTES  
15 USD 703-712

REGULATIONS (Attached)  
50 CFR Part 13  
50 CFR 21.41

3 NUMBER  
MB111895-0

4 RENEWABLE  
☒ YES  
☐ NO

5 MAY COPY  
☒ YES  
☐ NO

6 EFFECTIVE  
04/01/2009

7 EXPIRES  
03/31/2010

8 NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business)  
ODIN STEPHENS  
WILDLIFE BIOLOGIST

9 TYPE OF PERMIT  
DEPREDAATION - AIRPORT

10 LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED  
Airport Property and Grand Bay Wildlife Management Area, Lowndes County, Georgia

11 CONDITIONS AND AUTHORIZATIONS

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. You are authorized to take, temporarily possess, and transport the migratory birds specified below to relieve or prevent injurious situations impacting public safety. All take must be done as part of an integrated wildlife damage management program that emphasizes nonlethal management techniques. You may not use this authority for situations in which migratory birds are merely causing a nuisance.

(1) The following may be lethally taken: Minimum numbers and species.

(2) The following may be live-trapped and relocated: Minimum numbers and species.

E. You are authorized in emergency situations only to take, trap, or relocate any migratory birds, nests and eggs, including species that are not listed in Condition D (except bald eagles, golden eagles, or endangered or threatened species) when the migratory birds, nests, or eggs are posing a direct threat to human safety. A direct threat to human safety is one which involves a threat of serious bodily injury or a risk to human life.

You must report any emergency take activity to your migratory bird permit issuing office at 404-679-7070 within 72 hours after the emergency take action. Your report must include the species and number of birds taken, method, and a complete description of the circumstances warranting the emergency action.

F. You are authorized to salvage and temporarily possess migratory birds found dead or taken under this permit for (1) disposal, (2) transfer to the U.S. Department of Agriculture, (3) diagnostic purposes, (4) purposes of training airport personnel, (5) donation to a public charity (those suitable for human consumption), or (6) donation to a public scientific or educational institution as defined in 50 CFR 10.12. Any dead bald eagles or golden eagles salvaged must be reported within 48 hours to the National Eagle Repository at (303) 287-2110 and to the migratory bird permit issuing office at 404-679-7070. The Repository will provide directions for shipment of these specimens.

G. You may not salvage and must immediately report to U.S. Fish and Wildlife Service Law Enforcement any migratory birds that appear to have been

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12 REPORTING REQUIREMENTS

ANNUAL REPORT DUE: 1/31  
1/31

ISSUED BY

*Caroline P. Smith*

TITLE

PERMITS ADMINISTRATOR-REGION 4 MIGRATORY BIRD PERMIT PROGRAM

DATE

05/15/2009



## Standard Conditions Migratory Bird Depredation Permits 50 CFR 21.41

All of the provisions and conditions of the governing regulations at 50 CFR part 13 and 50 CFR part 21.41 are conditions of your permit. The standard conditions below are additional provisions and conditions of your permit. Failure to comply with the conditions of your permit could be cause for suspension of the permit. If you have questions regarding these conditions, refer to the regulations or, if necessary, contact your migratory bird permit issuing office. For copies of the regulations and forms, or to obtain contact information for your issuing office, visit: [www.fws.gov/permits/mbpermits/birdbasics.html](http://www.fws.gov/permits/mbpermits/birdbasics.html).

1. To minimize the lethal take of migratory birds, you are required to continually apply non-lethal methods of harassment in conjunction with lethal control.
2. Shotguns used to take migratory birds can be no larger than 10-gauge and must be fired from the shoulder. You must use nontoxic shot listed in 50 CFR 20.21(j).
3. You may not use blinds, pits, or other means of concealment, decoys, duck calls, or other devices to lure or entice migratory birds into gun range.
4. You are not authorized to take, capture, harass, or disturb bald eagles or golden eagles, or species listed as threatened or endangered under the Endangered Species Act found in 50 CFR 17, without additional authorization.

For a list of threatened and endangered species in your state, visit the U.S. Fish and Wildlife Service's Threatened and Endangered Species System (TESS) at: [www.fws.gov/endangered](http://www.fws.gov/endangered).

5. If you encounter a migratory bird with a Federal band issued by the U.S. Geological Survey Bird Banding Laboratory, Laurel, MD, report the band number to 1-800-327-BAND or [www.reportband.gov](http://www.reportband.gov).
6. This permit does not authorize take or release of any migratory birds, nests, or eggs on Federal lands without additional prior written authorization from the applicable Federal agency.
7. This permit does not authorize take or release of any migratory birds, nests, or eggs on State lands or other public or private property without prior written permission or permits from the landowner or custodian.
8. Unless otherwise specified on the face of the permit, migratory birds, nests, or eggs taken under this permit must be:
  - (a) turned over to the U.S. Department of Agriculture for official purposes,
  - (b) donated to a public educational or scientific institution as defined by 50 CFR 10, or
  - (c) completely destroyed by burial or incineration.
9. Subpermittees must be at least 18 years of age. As the permittee, you are legally responsible for ensuring that your subpermittees are adequately trained and adhere to the terms of your permit. You are responsible for maintaining current records of who you have designated as a subpermittee, including copies of letters you have provided.
10. You and any subpermittees must carry a legible copy of this permit and display it upon request whenever you are exercising its authority.

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11. You must maintain records as required in 50 CFR 13.46 and 50 CFR 21.41. All records relating to the permitted activities must be kept at the location indicated in writing by you to the migratory bird permit issuing office.
12. Acceptance of this permit authorizes the U.S. Fish and Wildlife Service to inspect any wildlife held, and to audit or copy any permits, books, or records required to be kept by the permit and governing regulations.
13. You may not conduct the activities authorized by this permit if doing so would violate the laws of the applicable State, county, municipal or tribal government or any other applicable law.

(DPRD - 4/7/2008)

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